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The Phonology of Modern South Arabian Harsusi of Oman

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The Phonology of Modern South Arabian Harsusi of Oman

by

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Dedication

I dedicate this work to ‘Allah’ The Almighty who ordered us, as Muslims, in His holy book ‘Quran’ to read and who gave me the strength, patience and belief that I can and should get this work done.

I also dedicate this work to my family, mother, father, brothers and sisters, whose constant prayers, support and love supported me throughout this work.

I especially dedicate this work to the jewel of my life, my fiancé and future life-partner, Basma who was always there with me to get this work done. Her encouragement, trust, love, care and understanding made it possible for me to keep going on despite all the difficulties. I will be always indebted to you.

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Abstract

The Phonology of Modern South Arabian Harsusi of Oman

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Harsusi is one of the five Modern South Arabian (MSA) languages spoken in the Sultanate of Oman. It is one of the least studied and known about languages in this group of Semitic languages. It is considered as a shifting language by the Ethnologue (Simons, G. F. & Charles, D. F., 2018) with around 6000 speakers.

Being spoken in the desert, in the middle of Oman, Harsusi enjoyed a relative isolation for some time from the other surrounding languages including Arabic; however, after 1970 Harsusi became into direct contact with Arabic. This direct contact, in addition to not being systematically taught and learned in official contexts, pose threats at the situation of Harsusi in Oman. Moreover, there is a scarcity of thorough linguistic studies on Harsusi and such studies can help in both preserving Harsusi, and understanding the features of the (MSA) group as a whole.

This report will provide an overview of the (MSA) language group. It will investigate the phonological structure of Harsusi in detail and provide a descriptive analysis of it. The main goal of this report is to explore the distribution of the sounds in

Harsusi. It will explore the phonemic realizations in addition to the allophonic variations and the rules governing their occurrence in different environments. Moreover, it will look at the syllable structure and the stress patterns in Harsusi. Understanding the phonological structure of Harsusi is very important for any future studies on the morphology, syntax or semantics of Harsusi.

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Chapter 1: Introduction

THE STUDY

This is a descriptive study that is based on data elicited from speakers of Harsusi in the town of Abu-Mudhabi in Al-Wusta Governorate of Sultanate of Oman, about 50 kilometers east of the city of Haima (19° 81' 92.2" N, 56° 68' 97.3" E) in Jiddat-el-Harasis on the way to Al-Duqm. This is part of an ongoing larger study which is still not completed, and more data is being collected on other aspects of the language. The current study is based on first-hand data collected in the field on four visits between 2016 and 2018.

This study is divided into two main chapters. The first chapter is an introduction providing some background information on the study in general and the Modern South Arabian Languages (MSA henceforth). The second chapter deals with the phonetics and phonology of Harsusi. It investigates the different phonemic consonant sounds of Harsusi paying particular attention to the class of the 'Emphatics' which has a secondary place of articulation at the posterior of the oral cavity. It also deals with the phonemic vowels and diphthongs. In terms of phonology, it examines the processes of devoicing and aspiration, diphthongisation and interaction between the glottal plosive and the voiced pharyngeal fricative. Other aspects of prosody are also treated such as stress and syllable structure.

MODERN SOUTH ARABIAN LANGUAGES

There are six Semitic languages spoken in Oman. All the languages belong to the Western branch of the Semitic language tree suggested by Huehnergard and Rubin (2011) as can be seen in Figure 1. 1. One of the languages is Arabic which belongs to the central

sub-branch within the Western branch and the other five are Modern South Arabian languages (MSA henceforth) that comprise their own branch (Huehnergard & Rubin, 2011). The most common language among these in Oman is Arabic which is the national language of the country and almost all the speakers of other languages in Oman, including MSA speakers, can speak it as their main language. The other Semitic languages in Oman include Shahri, Mehri, Harsusi, Bathari and Hobyot. These languages are spoken in different parts of the country, have different numbers of speakers and face different linguistical situations.

Genetically, Harsusi belongs to the MSA sub-branch of the Western branch of Semitic languages. Huehnergard & Rubin (2011) suggest the following language tree for the Semitic languages.

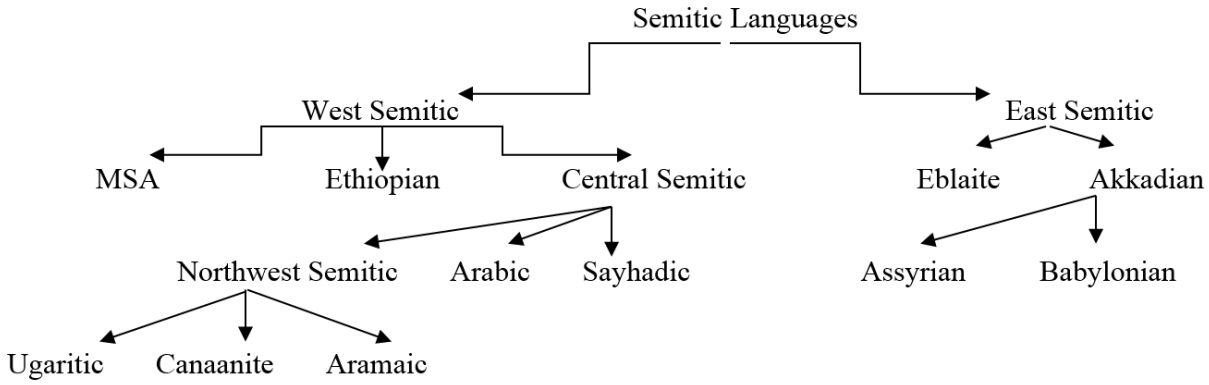

Figure 1. 1: Semitic languages family tree (Huehnergard & Rubin, 2011)

Within the MSA sub-branch, Rubin (2015) groups Harsusi in a Western MSA sub-branch along with Mehri and Bathari and Hobyot, while Shahri and Soqotri are grouped under an Eastern MSA sub-branch. See Figure 1.2.

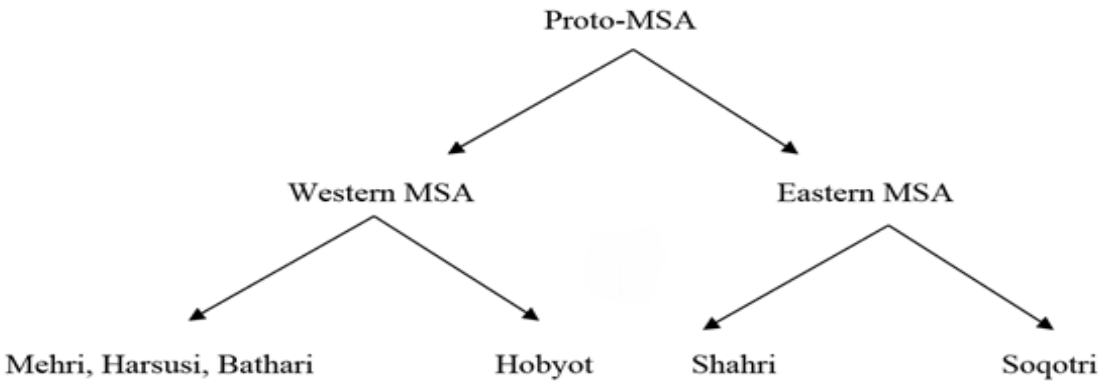

Figure 1. 2: MSA languages family tree (Rubin, 2015)

With regard to the distribution of the MSA languages, they are found at the Southern part of the Arabian Peninsula, mainly in the Sultanate of Oman and the Republic of Yemen. One of the MSA languages, which is Mehri, can also be found in the South East of The Kingdom of Saudi Arabia. Figure 1. 3 is a map adopted from Goldenberg (2013, p. 27) showing the distribution of the MSA languages in Southern Arabia and the islands of Soqotra in Yemen and Kuria and Muria in Oman (Currently known as Al-Hallaniyat Islands).

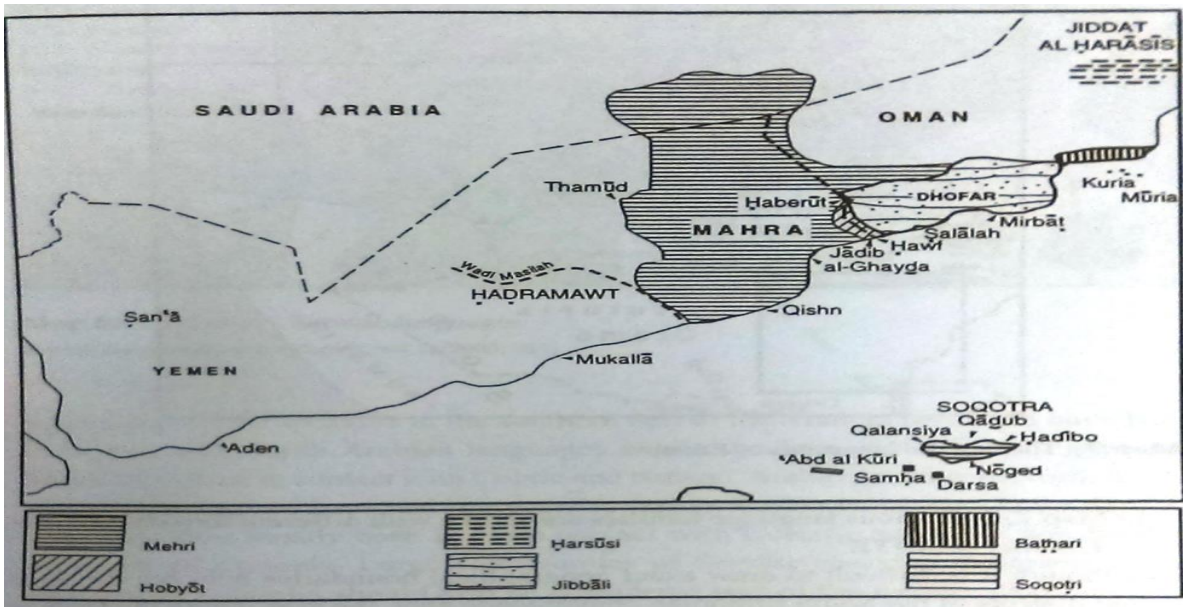

Figure 1. 3: MSA distribution map (Goldenberg, 2013)

Below is a discussion of the five MSA languages which are spoken in The Sultanate of Oman. The order of the languages in the discussion below follows their order in the language tree suggested by Rubin (2015) in Figure 1. 2 from Eastern branch to the Western branch.

Shahri (Also known as Jibbali)

Shahri is one of the most popular MSA languages in Oman. Most of the people in Oman, according to my knowledge, have heard about it and know it by the name 'Jibbali'. It is spoken in different towns and cities in the Governorate of Dhofar in the Southern part of The Sultanate of Oman. Unlike the other MSA languages, it is not the language of one tribe or clan, but rather a language used by different people in the region (Al Jahdhami, 2015). The Ethnologue (Simons, G. F. & Charles, D. F., 2018) estimated the number of its speakers to be 25.000 in 1993. Even though the scholarly works on

Shahri are scarce, compared to the other MSA languages it has been studied more in depth and elaborate works on its grammar and sound system are available (See Rubin, 2014).

Hobyot

Hobyot is one of the smallest MSA languages spoken in Oman with around a hundred speakers (Simons, G. F. & Charles, D. F., 2018). However, Rubin (2015) mentions the numbers to be perhaps one or two thousand speakers. According to some informants, it is spoken in Dhofar governorate in some mountainous towns between the Omani-Yemeni borders. Rubin (2015) claims Hobyot to be more closely related to both Mehri and Harsusi within the MSA language tree; nonetheless, he states that the data obtained from speakers shows a lot of interference from both Mehri and Shahri. The most recent work published on Hobyot is a vocabulary list. (See Nakano, 2013).

Bathari

Bathari is an MSA language that is spoken only in Oman. It is spoken by the Al Batahera tribe in the coastal areas of Al Wusta and Dhofar governorates. It is mainly spoken in the towns of Al-Shwaimia, Shalim, Alakbi, Sharbathat, Azakhar, Suqrah and Alhalanyat Islands (Al Jahdhami, 2015). The exact number of its speakers is not known and there are discrepancies in the numbers between different resources. Al Jahdhami (2015) mentions a few hundred as the number of speakers, but a recent study stated that there are only 12 elderly speakers who can remember it with varying proficiency

(Gasparini, 2017). It is closely related to Mehri and Harsusi and heavily affected by Arabic in its lexicon.

Mehri

Mehri is one of the largest MSA languages spoken in Oman with more than 50.000 speakers. It is also spoken in other countries in the Gulf such as The Republic of Yemen and The Kingdom of Saudi Arabia. It is very close in the MSA family to Harsusi and Bathari. In Oman, it is spoken in Dhofar governorate in the towns of Shalim, Almazyonah, Thamrit and Hasik (Al Jahdhami, 2015). Like the other MSA languages, it is in close contact with Arabic and marked as a shifting language. Luckily, it has been studied more in depth by linguists recently compared to the other MSA languages in Oman and the most recent studies of it were done by Aaron Rubin in 2010 and 2018 and Janet Watson in 2012 (See Rubin, 2010, 2018 & Watson, 2012).

Harsusi

Harsusi (called *Harsiyet* by its speakers and the word Harsusi in Arabic is used to refer to both the language and the speaker of the language) is another small MSA language spoken only in Oman by the Harasis (a collective noun used by Harsusi language speakers to refer to speakers of Harsusi language and an individual would be called Harsi) in Jiddat-el-Harasis in Al-Wusta governorate as can be seen in Figure 1. 3 above. It is probably one of the last MSA languages to be documented along with Bathari within the MSA family. The first data ever collected on Harsusi dates to the early 20th century when Bertram (1937) mentioned it for the first time in his paper 'Four

strange tongues from Central South Arabia-The Hadara group'. Harsusi was not described in print again until almost 30 years later when Johnstone (1977) published the first and only Harsusi lexicon. Since then, no other major work has been done on Harsusi and there is very little known about its linguistic features compared to other MSA languages such as Shahri and Mehri, for example.

Until 1970, Harsusi was relatively isolated from other surrounding languages given its geographical setting in the desert of Oman. The area where it is spoken, Jiddat-el-Harasis, is a gravel-plain desert in the middle of Oman. There are no major cities or towns in very close proximity to this area where other languages might be spoken such as Arabic. The area where Harsusi is spoken is at a distance of 450 kilometers from the northern populated areas, where Arabic is the main language. There are no other populated areas between the northern towns and the area of Harasis, but a plain unpopulated desert. Similarly, the nearest populated areas from the South, where Arabic and other MSA languages are spoken, are at a distance of more than 500 kilometers and there are no other populated areas except a plain desert. On the Western side there are no populated areas as it borders the great Arabian desert 'The Empty Quarter'. On the Eastern side; however, the town of Al-Duqm lies at the distance of around 200 kilometers away making it the closest area of contact with other languages such as Arabic (Omani Bedwin Dialect). This geographical setting isolated Harsusi for a long period; nonetheless, that has not been the case since 1970 when Arabic schooling was introduced. Today, Harsusi is in direct contact with the Arabic language. In 1977, Johnstone mentioned that the Harasis women were monoglot Harsusi speakers, but today, almost all the women are bilingual speakers of Harsusi and Arabic and some are probably monoglot Arabic speakers residing in other towns and cities. Indeed, many young

Harasis whether male or female, especially those residing in other big towns and cities away from Jiddat-el-Harasis, can only understand some Harsusi, but produce none.

The first estimation of the number of Harsusi speakers was given by Johnstone (1977) who estimated them to be around 600. Other scholars, such as Swiggers (1981), provided higher numbers at around 1000 men, but it is not clear whether the women were counted as part of this estimation or not. Swiggers (1981) assumed the low number provided by Johnstone was probably due to the fact that most Harasis men were not in the towns during that time of Johnston's data collection, but out working in the oil fields. Another reason of Johnstone's low estimation can be due to the Harasis' own life style. Being largely mobile pastoral herders, the Harasis tended to move based on the availability of water and pasture in small groups. Therefore, it might have been difficult given that life style to make accurate estimations of their numbers. It was not until 1970 when Sultan Qaboos came into power and started building modern Oman, that Haima became a central city with governmental and other services which in turn resulted in bringing the Harasis in a more stationary modern life style. The UNESCO estimated the number of Harasis to be around 3500-4000 (Moseley, 2010) and the most recent resource (Al-Jahdhami, 2015) estimated it to be a few thousands. It should be noted that the numbers provided by different resources do not specify if that is the actual number of speakers or an estimation of the number of people who belong to the Harasis' community or tribe. Currently, the number of Harasis can be estimated to be around 6000 people according to a revered Harsi tribal chief. However, accurate official numbers are still not available. Also, it should be noted here that some of these Harasis are probably monolingual Arabic speakers who reside in other towns or passive Harsusi speakers.

Regardless of the numbers, the Harsusi language is still spoken in its indigenous environment and it is still learned and used by younger generations. It should be noted

here, however, that it is labeled as a shifting language in the Ethnologue (Simons, G. F. & Charles, D. F., 2018) and as an endangered language by UNESCO. Johnstone (1977) asserted that "The social pressures on Harsusi are very considerable, and it is difficult to believe that it can survive long in an ocean of Arabic" (p. x). Moreover, Swiggers (1981) expected it to be replaced by Arabic within a few generations as it is surrounded by Arabic; nevertheless, many of the younger generation still speak Harsusi in their community today despite being affected by Arabic. The influence of Arabic can be largely seen in the lexicon as many younger speakers are replacing Harsusi words with Arabic equivalents.

BACKGROUND TO THE STUDY

This study is the first part of a larger on-going study on the structure of Harsusi language. As to date, there is no other study on the structure of Harsusi language except some notes on the grammar of Harsusi mentioned in Thomas Bertram's paper 'Four strange tongues from Central South Arabia-The Hadara group' which was published in 1937. Since then, no other thorough study has been done on the grammar of Harsusi except the lexicon which was published by Johnstone in 1977. The current study is the first attempt to explore the grammatical features of Harsusi and write a general grammar sketch of it.

The idea behind this study came as a sheer coincidence on a trip to the Southern part of Oman. Being interested in doing a PhD in linguistics, I initially was planning to do a documentary study on the Kumzari language which is an Indo-European language spoken in the Northern part of Oman in the village of Kumzar in Musandam peninsula near the Strait of Hormuz. However, on one of the trips to the South, I heard two young

men conversing in a shop in a language that I never heard before in Oman. Upon questioning, I was informed that they were Harasis and their language was called Harsusi. Driven by curiosity, I attempted to know more about the language and found that there was not enough linguistic information on the language and the most recent works were already more than 30 years old. Hence, came the decision to study Harsusi in depth and to attempt writing a grammatical sketch of the language covering its different linguistic features.

DATA SOURCES

This study is mainly based on first-hand data collected and recorded in the field. The sources include elicited speech in the form of word lists. Different sources have been used to elicit word lists. For example, a Swadesh list adopted from Haberl (2009) was used to elicit some of the most common words in the very first visit to the field. Another list of Arabic verbs adopted from Kasz (2013) has been used to elicit the verbs in Harsusi and how they are conjugated for different speakers and aspects. In addition, a list of 224 words which was elicited first by Domenyk Eades (See Eades & Morris, 2016) was also re-elicited for comparative reasons. Apart from the word lists, other words were elicited from the environment in the daily interactions with the consultants. A lot of the elicited data are result of notes taken while trying to learn the language as a researcher. The notes include names of body parts, kinship terms, personal pronouns, possessive pronouns, numbers, adverbs of time, question words, common verbs and short interactions. Some of the data is also the result of translating sentences from either Arabic or English into Harsusi and vice versa while attempting to learn the language in context. Apart from elicitation, natural speech was also recorded which included

folktales, poems, camel life stages and names, camel milking, everyday life activities and weddings and feasts. There were also three non-transcribed recordings of natural speech kindly provided by Eades and Morris (2016) which were transcribed in the field during data collection and used for comparative purposes.

LANGUAGE CONSULTANTS

Since the first attempts before recording data was to learn as much as possible of the language, the community in Abu-Mudhabi served as non-official consultants for teaching the language to me. However, officially, data was recorded of 15 main male consultants. The age of the consultants ranged from early twenties to early sixties. It should be noted, however, that only two of the consultants were over 60 years old and two in their forties while the majority were below 30 years old. All the consultants were male bilingual speakers of Arabic and Harsusi. The consultants below 30 years old, were all educated in public schools and some have had done their bachelors in universities while others were pursuing their bachelor's degrees at the time of conducting this study. All of those who did and were studying at universities also studied English and can speak it at different levels. All the consultants were residents of Abu-Mudhabi except one of the older consultants who was residing in the town of Al-Ajaez which is about 50 kilometers away East of Abu-Mudhabi.

DATA COLLECTION AND METHODOLOGY

All the data was recorded using a Tascam DR100-MKII 2-Channel Portable Digital Recorder with two headset microphones which were a Shure SM12A-CN headset

microphone and a Shure WH20 XLR dynamic headset microphone. Almost all the data was recorded indoors, but some data, especially concerning terminologies and life stages of camels, were recorded outdoor in encampments. However, in either situation, a microphone windscreen has been used to reduce wind noise which resulted in very clear recordings with minimum external noise. All sound files of the data were saved in uncompressed WAV format with a sample rate of 44100 Htz. All the sound files were saved on an external Hard-Drive and on an HP EliteBook Folio 1020 which was also used for analyzing the data. The sound files were later transcribed and analyzed using the acoustic programme PRAAT (Boersma & Weenink, 2018). All the transcribed words were saved in Excel worksheets for the ease of conducting comparisons and analyses.

Chapter 2: Phonemic Structure of Harsusi

This chapter deals with the sound system of Harsusi. It is divided into four main parts. The first part investigates the distinct phonemic consonants of Harsusi which are grouped based on their manner of articulation. It pays close attention to the group of phonemes with a secondary place of articulation known as 'Emphatics' in Harsusi. It also looks at some phonological processes such as devoicing and aspiration of certain voiced and voiceless plosives. The final section of this part looks at the interaction between the glottal stop /ʔ/ and the voiced pharyngeal fricative /ʕ/ in Harsusi. The second part looks at the vowel phonemes of Harsusi and process of diphthongisation of some long vowels. The third part investigates the different syllable structures of Harsusi. The last part deals with the stress pattern.

In terms of phonemes, Harsusi has 30 distinct consonants and 7 vowels. The consonant phonemes of Harsusi include 8 plosives, 14 fricatives, 3 laterals, 2 nasals, 1 trill and 2 glides. Among the consonants there are 6 consonants that have a secondary place of articulation known as the 'emphatic' consonants. The term 'Emphatic' is a general term used in this paper to include the phonemes that have either a pharyngealized or a glottalized secondary place of articulation and it does not include the plain pharyngeal sounds. Therefore, the consonants in Harsusi have a three-way distinction as they can be voiced, voiceless and emphatic. The vowel phonemes in Harsusi are 7 in total. There are 5 long vowels and 2 short vowels. The long vowels in Harsusi can also have short allophones in certain cases. All the consonants and vowels will be discussed in detail in the coming sections.

THE CONSONANT PHONEMES

The phonemic chart below shows all the distinct consonants of Harsusi. As can be seen, the plosives include 3 voiced, 3 voiceless and 2 voiceless emphatics. The fricatives include 4 voiced, 7 voiceless, 1 voiced emphatic and 2 voiceless emphatics. The laterals include a voiced, a voiceless and a voiceless emphatic. The nasals include 2. There is only one trill and 2 glides.

		Labial	Labiodental	Interdental	Alveolar	Palato-Alveolar	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosives	Voiced	b			d			g			
	Voiceless				t			k			ʔ
	Emphatic				tˤ			kʼ			
Fricatives	Voiced			ð	z				ʁ	ʕ	
	Voiceless		f	θ	s	ʃ			χ	ħ	h
	Emphatic			ðˤ	sˤ	ʃˤ					
Laterals	Voiced				l						
	Voiceless				ɬ						
	Emphatic				ɬˤ						
Nasals		m			n						
Trill					r						
Glides		w					j				

Table 2. 1: Harsusi consonant phonemes

Description of the Consonant Phonemes

In the following sections the different phonemes of Harsusi and their allophones will be discussed in detail following the manner of articulation. The phonemes will be shown as separate phonemes based on evidence from minimal and near minimal pairs. In addition, the different allophones of each phoneme and their conditioning environments will also be discussed.

Plosives

Harsusi has a three-way distinction of plosives as was mentioned before. It has voiced, voiceless and emphatic plosives. The voiced plosives include a labial /b/, an alveolar /d/ and a velar /g/. The voiceless plosives are an alveolar /t/, a velar /k/ and a glottal /ʔ/. The emphatics include an alveolar /tˤ/ and a velar /k'/. The 'Emphatics' will be discussed in detail under (The Phonetic Realization of 'Emphatics'). The devoicing of voiced plosives and aspiration of voiceless plosives in utterance final positions will be discussed in detail under (The Phonetic Realization of Non-Emphatic Plosives).

Harsusi has only one labial plosive phoneme which is a voiced labial plosive /b/. However, this labial plosive has two allophones which are a voiced labial plosive [b] and a voiceless labial plosive [p] that occur in different environments. There were no minimal pairs or near minimal pairs in the data to prove that the voiced and the voiceless labial plosives are separate phonemes rather than allophones of the same phoneme /b/. The data in the table below show both of these allophones in their environments.

Position	Non-Final	Final
Example	/kabˈki:bi/ - [kab.ˈki:bi] ‘my star M.SG’	/kabˈki:b/ - [kab.ˈki:p] ‘star M.SG’

Table 2. 2: Voiced plosive /b/ allophones

Therefore, it can be concluded that both [b] and [p] are in complementary distribution and are separate allophones of the same phoneme /b/. A phonological rule of their distribution can be stated as follows:

Rule 1:

/b/ ⟶ [p] / __# , and [b] / elsewhere

The previous rule indicates that the allophone [p] occurs only in utterance final position as in the word [kabˈki:p] ‘star M.SG’, while the voiced allophone [b] occurs in all other positions. The devoicing of the voiced plosives such as /b/ will be discussed in more detail under (The Phonetic Realization of Non-Emphatic Plosives).

Other plosives in Harsusi include a voiced alveolar /d/, a voiceless alveolar /t/ and a voiceless alveolar emphatic /tˤ/. A near minimal pair and a minimal pair were found which prove the voiced alveolar plosive /d/, the voiceless alveolar plosive /t/ and the voiceless emphatic alveolar plosive /tˤ/ as separate phonemes and not allophones of the same phoneme. The data in the table below show these near minimal and minimal pairs.

Phoneme	Example
/d/	/da:b/ - [ˈd̪a:p] ‘snake M.SG’
/t/	/to:b/ - [ˈt̪o:p] ‘got tired 3M.SG.PFV’
/tˤ/	/ˈtˤo:b/ - [ˈt̪ˤo:p] ‘type of a plant F.SG’

Table 2. 3: /d/, /t/ and /tˤ/ minimal pairs

The examples in table 2. 3 show that both /d/ and /t/ are in contrastive distribution in Harsusi and are separate phonemes. Similarly, the data also show that the voiceless alveolar emphatic plosive /tˤ/ is also in contrastive distribution with both /d/ and /t/ and is a separate phoneme rather than an allophone.

As for the voiced alveolar plosive /d/, it undergoes the same process of devoicing as the labial plosive /b/. It has two separate allophones which are [d̪] and [t̪] which occur in different environments. Rule 2 below formally states the different environments of these different allophones.

Rule 2:

/d/ ⟶ [t̪] / __# , and [d̪] / elsewhere

The previous rule indicates that the voiceless allophone [t̪] occurs only in utterance final position, while the voiced allophone [d̪] occurs elsewhere.

As for the voiceless alveolar plosive /t/, it also has two separate allophones which are a non-aspirated [t̪] and an aspirated [t̪ʰ]. Each of these allophones occurs in a conditioned environment and Rule 3 below formally states their distribution.

Rule 3:

/t/ ⟶ [t̪ʰ] / __# , and [t̪] / elsewhere

The previous rule indicates that the aspirated allophone [t̪ʰ] occurs only in utterance final positions, while the non-aspirated [t̪] occurs elsewhere. The aspiration of voiceless plosives will be discussed in detail under (The Phonetic Realization of Non-Emphatic Plosives).

The voiceless alveolar emphatic plosive /tˤ/ also has two separate allophones which are realized differently. It has pharyngealized [t̪ˤ] and a glottalized [t̪’] which are in contrastive distribution. Rule 4 below formally states their distribution.

Rule 4:

/tˤ/ ⟶ [t̪’] / __# , and [t̪ˤ] / elsewhere

The previous rule indicates that the glottalic allophone [t̪’] occurs only in utterance final positions, while the pharyngealized [t̪ˤ] occurs elsewhere. The voiceless alveolar emphatic plosive /tˤ/ will be discussed in detail in ‘Emphatics’ section (2.1.2).

In terms of velar plosives, Harsusi has a voiced velar plosive /g/, a voiceless velar plosive /k/ and a voiceless velar emphatic plosive /k’/. The minimal pairs in the table below prove each of these sounds as separate phonemes rather than allophones.

Phoneme	**Example**
/g/	/geroːf/ - [gəˈroːf] ‘brushed out 3M.SG.PFV’
/k/	/keroːf/ - [kəˈroːf] ‘sniffed 3M.SG.PFV’ /keˈboːr/ - [kəˈboːr] 'said phrase Allah akbar 3M.SG.PFV'
/k’/	/k’eˈboːr/ - [k’əˈboːr] 'buried 3M.SG.PFV'

Table 2. 4: /g/, /k/ and /k’/ minimal pairs

The examples in table 2. 4 show that both /g/ and /k/ are in contrastive distribution in Harsusi and are separate phonemes. Similarly, the data also show that the voiceless velar emphatic plosive /k’/ is also in contrastive distribution with the voiceless velar plosive /k/ and is a separate phoneme rather than an allophone.

Similar to the previously discussed voiced and voiceless plosives, such as the voiced alveolar plosive /d/ and the voiceless alveolar plosive /t/, the voiced velar /g/ and

the voiceless velar /k/ undergo the same processes of devoicing and aspiration, respectively. Therefore, the same rules 1 and 3 can be applied for the voiced velar /g/ and the voiceless velar /k/, respectively.

Rule 5:

/g/ ⟶ [k] / __# , and [g] / elsewhere

The previous rule indicates that the voiced velar plosive /g/ has two allophones which are a voiced velar plosive [g] and a voiceless velar plosive [k]. The voiceless allophone [k] occurs only in utterance final positions as in the word /neħa:g/ - [nəˈħa:k] ‘played 3M.SG.PFV’, while the voiced allophone /g/ occurs elsewhere as in the word /gero:f/ - [gəˈro:f] ‘brushed out 3M.SG.PFV’.

As for the voiceless velar plosive phoneme /k/, it also has two separate allophones which are a non-aspirated [k] and an aspirated [kʰ] and their distribution can be formally stated in rule 6 below.

Rule 6:

/k/ ⟶ [kʰ] / __# , and [k] / elsewhere

The previous rule indicates that the aspirated allophone [kʰ] and the non-aspirated [k] are in complementary distribution. The aspirated [kʰ] occurs only in utterance final or pausal positions, while the non-aspirated [k] occurs elsewhere. The aspiration of voiceless plosives will be discussed in detail under (The Phonetic Realization of Non-Emphatic Plosives).

A minimal pair was found in the data where the voiced velar plosive /g/ and the voiceless velar plosive /k/ occur in utterance final or pausal positions and their allophones [k] and [k^h], respectively, are realized. Table 2. 5 below shows this minimal pair where both of the allophones [k] and [k^h] of the phonemes /g/ and /k/, respectively, can be clearly distinguished.

Phoneme	**Example**
/g/	/ˈħeg/ - [ˈħʌk] ‘pilgrimage F.SG’
/k/	/ˈħek/ - [ˈħʌk^h] ‘scratched 3M.SG.PFV’

Table 2. 5: /g/ and /k/ allophones in utterance final or pausal positions

The voiceless velar emphatic plosive phoneme /k’/ has two separate allophones which are realized differently. It has a pharyngealized [k^ʕ] and a glottalic [k’] which are in complementary distribution. Rule 7 below formally states their distribution.

Rule 7:

/k’/ ⟶ [k^ʕ] / #__# , and [k’] / elsewhere

Rule 7 indicates that the pharyngealized allophone [k^ʕ] occurs only word medially, while the glottalic [k’] occurs elsewhere. The voiceless velar emphatic plosive /k’/ will be discussed in detail in ‘Emphatic’ sounds section (2.1.4).

The glottal stop /ʔ/ in Harsusi occurs mainly at word initial positions, but it was also attested in medial positions in few examples. At utterance final positions, the glottal stop has not been attested. The minimal pair in the table below shows that the glottal stop in Harsusi is a separate phoneme.

Phoneme	Example
/ʔ/	/ˈʔaːm/ - [ˈʔaːm] ‘if ’
/ħ/	/ˈħaːm/ - [ˈħạːm] ‘mother F.SG’

Table 2. 6: /ʔ/ and /ħ/ minimal pairs

As can be seen in table 2. 6, the glottal stop /ʔ/ can be established as a separate phoneme in Harsusi as it is in contrastive distribution with the voiceless pharyngeal fricative /ħ/. Unlike the other phonemes, the glottal stop /ʔ/ was not attested in many examples in word medial and utterance final positions. From a historical point of view, the corresponding sound to the Proto-Semitic glottal stop */ʔ/ in Mehri, which is the closest language to Harsusi within MSA, is Ø. Similarly, as will be seen below under (The Glottal /ʔ/ and the Pharyngeal /ʕ/), the glottal stop in Harsusi gets dropped except in initial positions. Table 2. 7 below shows examples where the glottal stop gets dropped in word medial positions compared to its presence in the same words at initial positions.

Position	Initial	Medial
Example	/ʔoːˈχoːr/ - [ʔawˑˈχawr] ‘postponed 3M.SG.PFV’ /ʔaːˈmuːr/ - [ʔaːˑˈmuːr] ‘said 3M.SG.PFV’	/ˈjoːχer/ - [ˈjaw.χər] ‘postpone 3M.SG.IPFV’ /ˈjuːmer/ - [ˈjaw.mər] ‘say 3M.SG.IPFV’

Table 2. 7: Glottal stop /ʔ/ in initial and medial positions

As can be seen in table 2. 7 above, in the word /ʔoːˈχoːr/ - [ʔawˑˈχawr] ‘postponed 3M.SG.PFV’, the glottal stop /ʔ/ gets dropped when the verb is used in its imperfective form as in /ˈjoːχer/ - [ˈjaw.χər] ‘postpone 3M.SG.IPFV’ instead of */ˈjoːʔχer/. Similarly, in the word /ʔaːˈmuːr/ - [ʔaːˑˈmuːr] ‘said 3M.SG.PFV’, the glottal stop /ʔ/ gets dropped when the verb is used in its imperfective form as in /ˈjuːmer/ - [ˈjaw.mər] ‘say 3M.SG.IPFV’ instead of */ˈjuːʔmer/. The glottal stop /ʔ/ and the voiced pharyngeal fricative /ʕ/ will be discussed in detail under (The Glottal /ʔ/ and the Pharyngeal /ʕ/).

Fricatives

Similar to plosives, Harsusi has a three-way distinction of fricatives. There are 14 fricatives in total including voiced, voiceless and emphatic fricatives. The voiced fricatives include an interdental /ð/, an alveolar /z/, a post-velar /ʁ/ and a pharyngeal /ʕ/. The voiceless fricatives include a labiodental /f/, an interdental /θ/, an alveolar /s/, a palato-alveolar /ʃ/, a post-velar /χ/, a pharyngeal /ħ/ and a glottal /h/. The emphatic fricatives include a voiced interdental /ðˤ/, a voiceless alveolar /sˤ/ and a voiceless palato-alveolar /ʃˤ/. The emphatics will be discussed in detail in 'Emphatics' section (2.1.2). The glottal stop /ʔ/ and the pharyngeal fricative /ʕ/ will be discussed in detail under (The Glottal /ʔ/ and the Pharyngeal /ʕ/).

The labiodental voiceless fricative /f/ can be established as a separate phoneme in Harsusi given the minimal pair in table 2. 8 below.

Phoneme	**Example**
/f/	/ˈfaːm/ - [ˈfaːm] 'foot M.SG'
/ħ/	/ˈħaːm/ - [ˈħa̤ːm] 'mother F.SG'

Table 2. 8: /f/ and /ħ/ minimal pair

As for the interdental fricatives, Harsusi has three distinct interdentals which are a voiced interdental fricative /ð/, a voiced interdental emphatic fricative /ðˤ/ and a voiceless interdental fricative /θ/. Minimal pairs have been found in the data that prove each of these sounds as separate phonemes. Table 2. 9 below shows these minimal pairs.

Phoneme	Example
/ð/	/jeðri/ - [jið.ˈri] ‘bleeds 3M.SG.IPFV’ /ðeˈfi:r/ - [ðə.ˈfi:r] ‘type of plant used as medicine M.SG’
/ðˤ/	/ðˤefi:r/ - [ðˤə.ˈfi:r] ‘fingernail M.SG’
/θ/	/jeθri/ - [jiθ.ˈri] ‘damps 3M.SG.IPFV’

Table 2. 9: /ð/, /ðˤ/ and /θ/ minimal pairs

Given the data in table 2. 9 above, it can be said that the voiced and voiceless interdental fricatives can be established as separate phonemes in Harsusi given the minimal pair of the words /jeðri/ - [jið.ˈri] ‘bleeds 3M.SG.IPFV’ and /jeθri/ - [jiθ.ˈri] ‘damps 3M.SG.IPFV’ which prove them to be in contrastive distribution. Similarly, the voiced plain and emphatic interdental fricatives /ð/ and /ðˤ/ can also be established as separate phonemes given the minimal pair of the words /ðeˈfi:r/ - [ðə.ˈfi:r] ‘type of plant used as medicine M.SG’ and /ðˤefi:r/ - [ðˤə.ˈfi:r] ‘fingernail M.SG’ which show that they are in contrastive distribution.

The alveolar fricatives in Harsusi are a voiced /z/, a voiceless /s/ and an emphatic /sˤ/. Minimal pairs and near minimal pairs have been found in the data which show these sounds to be in contrastive distribution and; therefore, separate phonemes rather than allophones of same phoneme. Table 2. 10 below shows the near minimal pairs and minimal pairs of the alveolar fricatives.

Phoneme	Example
/z/	/zero:na/ - [zə.ˈro:.na] ‘will visit 3M.SG.FUT’
/s/	/si:rona/ - [si:ˈro:.na] ‘will go 3M.SG.FUT’ /seˈbo:r/ - [sə.ˈbo:r] ‘scouted 3M.SG.PFV’
/sˤ/	sˤeˈbo:r/ - [sˤə.ˈbo:r] ‘waited 3M.SG.PFV'

Table 2. 10: /z/, /s/ and /s/ minimal pairs

As can be seen in table 2. 10, the voiced alveolar fricative /z/ and the voiceless alveolar fricative /s/ can be established as separate phonemes given the near minimal pair which show that they are in contrastive distribution and; therefore, separate phonemes. In addition, the minimal pair of the words /seˈboːr/ - [səˈboːr] 'scouted 3M.SG.PFV' and /sˤeˈboːr/ - [sˤəˈboːr] 'waited 3M.SG.PFV' also show that the emphatic fricative /sˤ/ is in contrastive distribution with the voiceless alveolar fricative /s/ and; therefore, is a separate phoneme in Harsusi.

Among the non-emphatic alveolar fricatives, the voiceless /s/ is the most widespread in Harsusi words. On the other hand, the voiced alveolar fricative /z/ is less common and was not found in utterance final positions except in the word /ˈχabz/ - [ˈχa̤bs] 'bread M.SG'. Moreover, the voiced alveolar fricative /z/ gets devoiced in utterance final or pausal positions, due to pre-pausal devoicing in Harsusi (See section 2.1.3) and this can be formally stated in Rule 8 below.

Rule 8:

/z/ ⟶ [s] / __# , and [z] / elsewhere

Rule 8 indicates that the voiced alveolar fricative /z/ has two separate allophones which are [s] and [z] where [s] occurs only in pre-pausal positions, while [z] occurs elsewhere.

In terms of palato-alveolar sounds, Harsusi has two phonemes which are a voiceless palato-alveolar fricative /ʃ/ and a voiceless palato-alveolar emphatic fricative /ʃˤ/. The non-emphatic palato-alveolar fricative /ʃ/ is more common in Harsusi words than the emphatic. The non-emphatic palato-alveolar fricative /ʃ/ can occur word initially, medially and finally and has only one allophone in all environments which is [ʃ].

The voiceless palato-alveolar fricative /ʃˤ/ occurs very rarely in Harsusi. It was attested only in a few words in the data. A near minimal pair was found in the data that show the voiceless palato-alveolar emphatic fricative /ʃˤ/ as a separate phoneme. Table 2. 11 below shows the near minimal pair for the voiceless palato-alveolar emphatic /ʃˤ/.

Phoneme	**Example**
/ʃˤ/	/ʃˤeˈroːm/ - [ʃˤəˈroːm] ‘slapped 3M.SG.PFV’
/sˤ/	/sˤeˈroːmeh/ - [sˤəˈroːməh] ‘now ADV’

Table 2. 11: /ʃˤ/ and /sˤ/ minimal pair

Given the data in table 2. 11, it is clear that the voiceless palato-alveolar emphatic fricative /ʃˤ/ and the voiceless alveolar emphatic fricative /sˤ/ are in contrastive distribution. Therefore, the palato-alveolar emphatic fricative /ʃˤ/ can be established as a separate phoneme in Harsusi. There were no minimal or near minimal pairs in the data for the voiceless palato-alveolar fricative /ʃ/ and the voiceless palato-alveolar emphatic fricative /ʃˤ/. However, the emphatic can be distinguished from the non-emphatic in that it affects the surrounding vowels by raising their F1 formants and lowering their F2 formants. The voiceless palato-alveolar emphatic fricative /ʃˤ/ will be discussed in detail in ‘Emphatics’ section (2.1.2).

As for the post-velar sounds, Harsusi has a voiced post-velar fricative /ʁ/ and a voiceless post-velar fricative /χ/. The data shows that these two sounds are not allophones in Harsusi, but separate phonemes and this can be seen in the minimal pair in table 2. 12 below.

Phoneme	Example
/ʁ/	/ʁeˈboːr/ - [ʁəˈboːr] ‘met 3M.SG.PFV’
/χ/	/ˈχeboːr/ - [χəˈboːr] ‘knew 3M.SG.PFV’

Table 2. 12: /ʁ/ and /χ/ minimal pairs

As can be seen in the data in table 2. 12 above, the voiced and voiceless post velar fricatives /ʁ/ and /χ/ are in contrastive distribution given the minimal pair. Thus, they are both separate phonemes rather than allophones of the same phoneme in Harsusi.

The voiced pharyngeal fricative /ʕ/ occurs very rarely in Harsusi and its occurrence differs from one speaker to another. It was attested only in word initial and medial positions and was never attested in utterance final or pausal positions as table 2. 13 shows below.

Position	Initial	Medial
Example	/ˈʕiːd/ - [ˈʕi̪ːt̪] ‘Eid M.SG’ /ˈʕajn/ - [ˈʕa̪jn] or [ˈʔajn] ‘eye F.SG’	/ʃeˈʕiːr/ - [ʃəˈʕi̪ːr] ‘barley M.SG’ /meʕˈkaːz/ - [məʕˈkaːz] ‘crutch M.SG’

Table 2. 13: Voiced pharyngeal fricative /ʕ/ in initial and medial positions

As can be seen in table 2. 13 above, all the words in which the voiced pharyngeal fricative /ʕ/ was found seem to be Arabic loan words into Harsusi. In some other words, such as the word for ‘eye’, we can see that the speakers differ in using either the voiced pharyngeal fricative /ʕ/ or the glottal stop /ʔ/. The data analysis shows that the voiced pharyngeal fricative /ʕ/ in Harsusi has been substituted by the glottal stop /ʔ/ in various environments. However, for the sake of simplification and since the voiced pharyngeal fricative /ʕ/ still occurs in few examples provided by younger generation speakers, both of the symbols /ʕ/ and /ʔ/ will be used as they occur in the data. The voiced pharyngeal

fricative /ʕ/ and the glottal stop /ʔ/ in Harsusi will be discussed in more detail under (The Glottal /ʔ/ and the Pharyngeal /ʕ/).

The voiceless pharyngeal fricative /ħ/ and the voiceless glottal fricative /h/ are also found to be separate phonemes in Harsusi. Table 2. 14 below shows a minimal pair which was found in the data.

Phoneme	**Example**
/ħ/	/ħeˈroːm/ - [ħəˈroːm] 'forbidden ADJ' /jeħroːk'/ - [jiħˈroːk'] 'burns 3M.SG.IPFV'
/h/	/heˈroːm/ - [həˈroːm] 'type of tree M..PL' /jehroːk'/ - [jihˈroːk'] 'steals 3M.SG.IPFV'

Table 2. 14: /ħ/ and /h/ minimal pairs

The examples in table 2. 14 show that both /ħ/ and /h/ are in contrastive distribution in Harsusi as they occur in similar environments and are; therefore, separate phonemes rather than allophones of the same phoneme.

Laterals

There are three lateral phonemes in Harsusi with a three-way distinction. There is a voiced alveolar lateral /l/, a voiceless lateral fricative /ɬ/ and a voiceless emphatic lateral fricative /ɬˤ/. The emphatic lateral fricative will be discussed in detail in 'Emphatics' section (2.1.2).

The laterals in Harsusi fall into three groups which are a voiced alveolar lateral /l/, a voiceless lateral fricative /ɬ/ and a voiceless emphatic lateral fricative /ɬˤ/. The three different laterals can be proven as separate phonemes based on minimal and near minimal pairs. Table 2. 15 below shows these near minimal and minimal pairs.

Phoneme	Example
/l/	/jelħoːk’/ - [jil.ˈħoːk’] ‘catch up/help 3M.SG.IPFV’
/ɬ/	/jeɬboːb/ - [jiɬ.ˈboːb] ‘climb 3M.SG.IPFV’
/ɬˤ/	/jeɬˤħoːk/ - [jiɬˤ.ˈħoːkʰ] ‘laughs 3M.SG.IPFV’ /jeɬˤboːb/ - [jiɬˤ.ˈboːb] ‘chat 3M.SG.IPFV’

Table 2. 15: /l/, /ɬ/ and /ɬˤ/ minimal pairs

Given the data in table 2. 15, it is clear that the voiced alveolar lateral /l/ is a separate phoneme as it is in contrastive distribution with the voiced lateral emphatic fricative /ɬˤ/ as can be seen in the near minimal pair of /jelħoːk’/ - [jil.ˈħoːk’] ‘catch up/help 3M.SG.IPFV’ and /jeɬˤħoːk/ - [jiɬˤ.ˈħoːkʰ] ‘laughs 3M.SG.IPFV’. Similarly, the voiceless lateral fricative /ɬ/ can be proven as a separate phoneme given the minimal pair of the words /jeɬboːb/ - [jiɬ.ˈboːp] ‘climb 3M.SG.IPFV’ and /jeɬˤboːb/ - [jiɬˤ.ˈboːp] ‘chat 3M.SG.IPFV’ which show that both the voiceless lateral fricative /ɬ/ and the voiceless lateral emphatic fricative /ɬˤ/ are in contrastive distribution.

As for the voiceless lateral fricative /ɬ/ and the voiceless lateral emphatic fricative /ɬˤ/, the data show that they differ in two aspects. The first difference is that the voiceless lateral emphatic fricative /ɬˤ/ has a secondary place of articulation in the pharynx compared to the voiceless lateral fricative /ɬ/. The second difference between those two phonemes is the voicing assimilation. The voiceless lateral fricative /ɬ/ has only one allophone which is [ɬ] that occurs in all environments, but the voiceless emphatic lateral fricative /ɬˤ/ can have two distinct allophones. Table 2. 16 below shows the different allophones of the voiceless lateral emphatic fricative in different environments.

Position	Example
Initial	/ˈɬˤeːga/ - [ˈɬˤaj.ga]‘house M.SG’
Medial	/heˈɬˤoːr/ - [həˈɮˤoːr] ‘green M.SG’ /ʔaː ɬˤˈjoːɬˤ/ - [ʔaːɮˤ.joːɬˤ] ‘bones M.PL’
Final	/ˈjeɬˤlˤ/ - [ˈjilˤː] ‘frightened/got scared 3M.SG.PFV’

Table 2. 16: Voiceless lateral emphatic fricative /ɬˤ/ in different positions

As can be seen in table 2. 16, the voiceless lateral emphatic fricative has a marked voiced allophone [ɮˤ] and an unmarked voiceless allophone [ɬˤ]. The marked allophone [ɮˤ], as can be seen in table 2. 16, occurs as a result of voicing assimilation in intervocalic positions mainly as in the words /heˈɬˤoːr/ - [həˈɮˤoːr] ‘green M.SG’ and /ʔaː ɬˤˈjoːɬˤ/ - [ʔaːɮˤ.joːɬˤ] ‘bones M.PL’. On the other hand, the non-marked voiceless allophone [ɬˤ] occurs in all the other environments as in the words /ˈɬˤeːga/ - [ˈɬˤaj.ga] ‘house M.SG’ and /ˈjeɬˤlˤ/ - [ˈjilˤː] ‘frightened/got scared 3M.SG.PFV’. The distribution of the voiceless lateral emphatic fricative /ɬˤ/ can be formally stated in Rule 9 below.

Rule 9:

/ɬˤ/ ⟶ [ɮˤ] / V__V , and [ɬˤ] / elsewhere

The previous rule indicates that in case of the voiceless lateral emphatic fricative /ɬˤ/, the allophone [ɮˤ] occurs only in intervocalic positions and the allophone [ɬˤ] occurs elsewhere.

Nasals

Harsusi has only two nasal sounds. It includes a labial nasal /m/ and an alveolar nasal /n/.

The two nasal sounds can be proved as separate phonemes using the minimal pair of the dependent possessive markers for plural subjects. Table 2. 17 shows the data that prove both nasals as separate phonemes.

Phoneme	**Example**
/m/	/ħajˈbiːtkem/ [ħaj.ˈbit.kəm] ‘your camel M.PL’
/n/	/ħajˈbiːtken/ [ħaj.ˈbit.kən] ‘your camel F.PL’

Table 2. 17: /m/ and /n/ minimal pairs

As can be seen in table 2. 17, the possessive marker for plural masculine subjects is /-kem/ - [kəm] ‘your M.PL’ and the possessive marker for plural feminine subjects is /ken/ - [kən] ‘your F.PL’. It is clear that the labial nasal /m/ and the alveolar nasal /n/ are in contrastive distribution as they occur in similar environments. Therefore, they are both separate phonemes in Harsusi and not allophones.

The alveolar nasal /n/ can be realized differently in different contexts. Table 2. 18 below shows examples of the alveolar nasal /n/ in different environments.

Phoneme	**Example**
/n/	/nˈħaː/ - [n̥ˈħa̤] ‘we 1C.PL.INCL’ /ˈkelen/ - [ˈkʌ.lən] ‘all 1C.PL.INCL’ /ðeˈneːb/ - [ðə.ˈneːp] ‘tail M.SG’ /ðeˈneːb/ - [ðəm.ˈbuː.t̪ən] ‘tails F.PL’

Table 2. 18: /n/ in various contexts

As can be seen in table 2. 18, the alveolar nasal has two different allophones which are [m] and [n]. The allophone [m] occurs when it is followed by the bilabial /b/ as a result of place assimilation, while the allophone [n] occurs elsewhere. We can state the phonological distribution of nasal /n/ allophones formally as follows:

Rule 10:

/n/ ⟶ [m] / __ /C/[+labial] , and [n] / elsewhere

Trills

There is only one voiced alveolar trill in Harsusi which is /r/. Table 2. 19 below shows a minimal pair found in the data which shows that the voiced alveolar trill /r/ in Harsusi is a separate phoneme.

Phoneme	**Example**
/r/	/jerħo:k'/ - [jir.ˈħo:k'] 'to get distant 3M.SG.IPFV'
/l/	/jelħo:k'/ - [jil.ˈħo:k'] 'cath up/help 3M.SG.IPFV'

Table 2. 19: /r/ and /l/ minimal pairs

Given the minimal pair in table 2. 19 above, it is clear that the voiced alveolar trill /r/ is in contrastive distribution with the voiced lateral /l/ and; therefore, the voiced alveolar trill /r/ is a separate phoneme in Harsusi. With regard to allophones, the data also shows that the voiced alveolar trill /r/ in Harsusi has only one allophone occurring in all the environments which is [r].

Glides

In addition to some vowels that get diphthongized, which will be discussed in vowels section below, Harsusi has two glides which are a voiced labial velar /w/ and a voiced palatal /j/. Table 2. 20 below shows data of minimal pairs that show the glides to be separate phonemes in Harsusi.

Phoneme	Example
/w/	/ˈwa:/ - [ˈwa:] ‘and’ /jeˈte:w/ - [jiˈte:o] ‘eats 3M.SG.IPFV’
/k/	/ˈka:/ - [ˈka:] ‘with’
/j/	/be-ħeˈllaj/ - [bə.ħə.ˈl:ai] ‘at night/tonight’ /ħeju:m/ - [ħi.ˈju:m] ‘sun F.SG’
/g/	/ħego:m/ - [ħə.ˈgo:m] ‘sheltering camels and returning home 3M.SG.PFV’

Table 2. 20: /w/ and /j/ minimal pairs

The data in table 2. 20 show that the voiced labial velar glide /w/ is in contrastive distribution with the voiceless velar plosive /k/. Similarly, the voiced palatal glide /j/ is in contrastive distribution with the voiced velar plosive /g/. The minimal pair of the words /ˈwa:/ - [ˈwa:] ‘and’ and /ˈka:/ - [ˈka:] ‘with’, and /ħego:m/ - [ħə.ˈgo:m] ‘sheltering camels and returning home 3M.SG.PFV’ and /ħeju:m/ - [ħi.ˈju:m] ‘sun F.SG’ show that both /w/ and /j/ are separate phonemes in Harsusi, respectively.

It can also be seen in table 2. 20 above, that the voiced labial velar glide /w/ and the voiced palatal glide /j/ have two separate allophones for each. Each one of them has a marked allophone that occurs in a given environment and an unmarked allophone that occurs elsewhere. The voiced labial velar glide /w/ has the allophone [o] that occurs in utterance final or pausal positions and the allophone [w] that occurs elsewhere, while the voiced palatal /j/ has the allophone [i] that occurs in utterance final or pausal positions and the allophone [j] that occurs elsewhere. Rule 11 below formally states the distribution of both of these allophones for /w/ and /j/.

Rule 11:

/C/ [- Consonantal , - Syllabic] ⟶ /V/ /__#, and /C/ [- Consonantal , - Syllabic] / elsewhere

The previous rule indicates that in case of the glides, the allophones [o] and [i] of the phonemes /w/ and /j/, respectively, occur only in utterance final positions and the allophones [w], [j], occur elsewhere.

It should be noted here that Harsusi also has some allophonic diphthongs as a result of diphthongisation, which will be discussed under section (2.2.2.4); however, the voiced labial velar glide /w/ and the voiced palatal glide /j/, in table 2. 20 examples above, are separate glide phonemes and not diphthongs. This can be proven by looking at the consonantal roots of the words. For example, the word for 'the night' in Harsusi is /ħelˈleːjoː/ - [ħəˈliː.joː] 'the night M.SG' with a consonantal root of /l-l-y/ and the initial /ħ/ is a definite marker. However, when it occurs in a phrase like 'at the night' it becomes as /be-heˈllaj/ - [bəˈħəˈlːai] and we can see that the voiced palatal glide /j/ shows as [i] in the final position. Similarly, if we look at the word /ˈbiːrw/ - [ˈbiː.ro] 'gave birth 3F.PL.PFV' we can see that the utterance final voiced labial velar shows up as a [o]; however, the consonantal root of this word is /b-r-w/ and the voiced velar glide /w/ shows up clearly in the word /berˈwoːt/ - [bərˈwoːt̪] 'gave birth 3F.SG.PFV'. In comparison, the word for 'to set' in Harsusi with the consonantal root /g-n-ʔ/ is /geˈnoː/ - [gəˈnoː] 'set 3M.SG.PFV' and no glide shows up in the third person feminine form /geˈnoːt/ [gəˈnoːt̪] 'set 3M.SG.PFV' as was seen in /berˈwoːt/ - [bərˈwoːt̪] 'gave birth 3F.SG.PFV'.

The Phonetic Realization of 'Emphatics'

As was mentioned above, under 2.1.1.1, 2.1.1.2 and 2.1.1.3 Harsusi has a three-way distinction of plosives, fricatives and laterals. In addition to voiced and voiceless plosives and fricatives, Harsusi has another third set of plosives and fricatives known as 'Emphatics'. There are six consonants in Harsusi that fall under this category which are:

/k’/, /tˤ/, /sˤ/, /ʃˤ/, /ðˤ/ and /lˤ/. The term ‘Emphatics’ is a general term that is used in Semitic languages to describe a set of sounds that share a secondary ‘back’ articulation (Watson, 2012 : 39). The phonetic realization of the secondary articulation differs in different languages and sometimes even in different dialects of the same language between a pharyngealized, uvularized or glottalized realization (See Al-Tamimi, Al-Zoubi, & Tarawnah 2009; Giannini & Pettorino 1982; Ghazeli 1977; Jongman, Herd, Al-Masri, Sereno, & Combest 2011; Laufer & Baer 1988; Watson, 1999; Watson, 2012; Watson & Bellem 2010). This section will try to look more in depth at the phonetic realization of the group of sounds grouped as ‘Emphatics’ in Harsusi. It will look at their articulatory processes at initial, medial and utterance final or pausal positions.

Kogan (2011) mentions that the ‘Emphatic’ sounds in modern Semitic have been attested to be realized in two different ways. According to him, the glottalized emphatic sounds are typical of Eastern Semitic languages. He adds that the glottalized realization of ‘Emphatics’ was discovered in Jibbali by Fresnel in 1838 and that Johnstone mentioned it in other MSA languages later. The second phonetic realization Kogan mentions is velarized or pharyngealized emphatics accompanied by the backing of the adjacent vowels.

Interestingly, the group of ‘Emphatics’ in Harsusi includes both pharyngealized and glottalized consonants in terms of the phonetic realization of the secondary place of articulation. Even though it will be rather difficult to establish this group as a natural class based on phonological features, they can be established as a distinctive phonemic group in Harsusi based on their behaviour in contexts. All the sounds grouped under the term ‘Emphatic’, regardless of their phonetic realization, affect the vowel formants of their surrounding vowels. The vowel formants measurements, which were done using PRAAT (Boersma & Weenink, 2018), showed that in the presence of an ‘Emphatic’

sound, the F1 of the surrounding vowel rises and the F2 lowers compared to the same vowel's F1 and F2 formants in other environments. Therefore, these sounds are grouped together under the general term 'Emphatic' given their effect on the surrounding vowel formants.

Different studies have been conducted to explore the articulatory processes of emphatic sounds in different languages and dialects and they found different results about the exact place of the secondary articulation. Jongman et al. (2011) stated that various studies were conducted exploring the articulatory correlates of emphatics in Arabic, but there was still no consensus on the nature of the posterior constriction which is the place of the secondary articulation. Some studies such as Ghazeli (1977) and Al-Tamimi, Alzoubi and Tarawnah (2009) found that the articulation of emphatics involves tongue's retraction towards the posterior pharynx wall near the uvula (Jongman et al., 2011 : 85). On the other hand, other studies such as Laufer and Bear (1988) stated that the constriction in producing the emphatics was not at the level of the uvula, but much lower (Jongman et al., 2011 : 85).

Even though there is no consensus on the emphatics' exact place of articulation, various studies attested that when the emphatics occur in a word, they have an effect on their surrounding sounds. The studies found that the effect of emphatics shows mainly on the surrounding vowels' F1 and F2 formants. The vowels were found to have higher measurements of F1 formant and lower measurements of F2 formant when following emphatic sounds compared to when following non-emphatic sounds (Bin-Muqbil 2006; Jongman et al. 2011; Yeou 1997; Zawaydeh 1999).

According to Rubin (2010), the first scholar who recognized the 'Emphatic' consonants in MSA Languages as glottalized was Thomas Johnstone. Johnstone (1975) stated that the degree of glottalization of these consonants varies depending on their

position whether initial, medial, or final. Swiggers (1981) confirmed Johnstone's results and stated that all the emphatics in Harsusi are glottalized especially in initial and final positions. Moreover, he distinguished between two types of glottalization which are pre-glottalization and post-glottalization in Harsusi. According to Swiggers (1981), the voiceless 'Emphatics' are post-glottalized, while the voiced are pre-glottalized. A point to be noted here is that the results of Rubin and Swiggers depended on Johnstone's data which he collected during his fieldworks on these languages between the 60s and 70s of the previous century. Therefore, the area of 'Emphatic' consonants in MSA Languages remained vague.

Later, Simeone-Senelle (1997) based on data collected by her on Soqotri and Mehri also mentioned the glottalization to be weaker than in Ethiopic and to be dependent on phonological context and dialect. The most recent study on Emphatics in MSA languages conducted by Watson and Bellem (2010) on the Mahriyot dialect of Mehri concluded that only the velar stop /kˤ/ is glottalized in all phonological environments, while all the other emphatics are rather pharyngealized as in some Arabic dialects. In addition, they stated that the voiced stops and emphatic stops are devoiced in final positions and are released on a glottalic air-stream (Watson & Bellem, 2010 : 352). Kogan (2011) confirms Watson and Bellem (2010) results regarding the realization of glottalized emphatics. Based on his fieldwork on Soqotra, he says that his results agree with Watson and Bellem (2010) that only the voiceless velar /k'/ is possibly glottalized.

Below, each one of these emphatics will be discussed in detail to explore how they are articulatorily realized in Harsusi since the emphatics in MSA languages are the most interesting, and the least known about consonants.

Voiceless Alveolar Emphatic Plosive /tˤ/

In the Mehri dialect of Mahriyot, Watson and Bellem (2010) found that the voiceless alveolar plosive /tˤ/ is not an ejective, but patterns with the other emphatics in having a backing effect on surrounding vowels. Similarly, the voiceless alveolar emphatic plosive /tˤ/ in Harsusi is a pharyngealized and not a glottalized emphatic as will be seen below. As was established under (Plosives) above, it is a separate phoneme in Harsusi given the minimal pair /ˈtˤoːb/ - [ˈt̪ˤo̪ːp] 'type of a plant F.SG' and /ˈtoːb/ - [ˈt̪oːp] 'got tired 3M.SG.PFV'. Similar to the other phonemes of Harsusi, it can occur word initially, medially and finally in pausal positions. However, it is realized differently when it occurs in utterance final or pausal positions compared to when it occurs at word initial and medial positions. It can be said that it has two different allophones which are [tˤ] and [t']. Its phonetic distribution can be formally stated in the phonological Rule 12 below.

Rule 12:

/tˤ/ ⟶ [t'] / __# , and [tˤ] / elsewhere

The previous rule indicates that the allophone [t'] occurs only in utterance final positions as in the word /xeˈjoː tˤ/ - [xəˈjoːt̪ˤ] 'sewed 3M.SG.PFV', while the allophone [tˤ] occurs elsewhere.

The pharyngeal realization of the voiceless alveolar emphatic plosive /tˤ/ can be shown by comparing the figures 2. 1, 2. 2 and 2. 3. It can be seen that the voiceless alveolar emphatic plosive /tˤ/ in Harsusi is not realized as a glottalized which is similar to what was found by Watson and Bellem (2010). The 'spike' typical of glottalic initiation or burst does not show in any of the figures. Figure 2. 3 does show a small 'spike', and it

looks from the spectrogram that there is a glottalic burst after the initial oral burst in /tˤ/; however, the degree of the burst and length of the spike are very small which means it is a weak glottalic realization. Therefore, it can be concluded that the voiceless alveolar emphatic plosive /tˤ/ in Harsusi is not realized as a glottalized emphatic except in final positions.

Below are the figures showing the waveforms and spectrograms of the voiceless alveolar emphatic plosive /tˤ/ in Harsusi words.

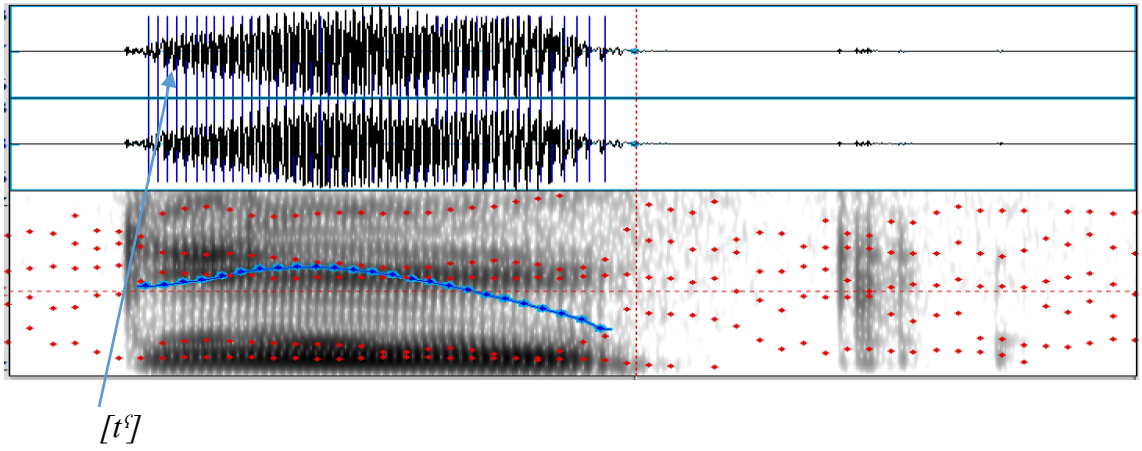

Figure 2. 1: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /tˤ/ in this token of /tˤo:b/ - [t̪ˤo̪:p] 'type of a plant'.

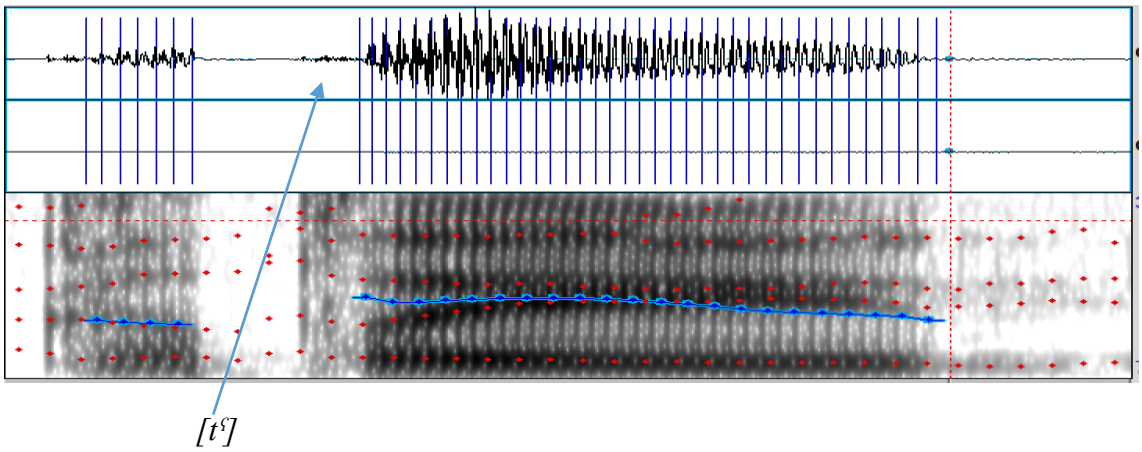

Figure 2. 2: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /tˤ/ in this token of /kʼəˈtˤiːn/ - [kʼəˈt̪ˤiːn] 'slim M.SG'.

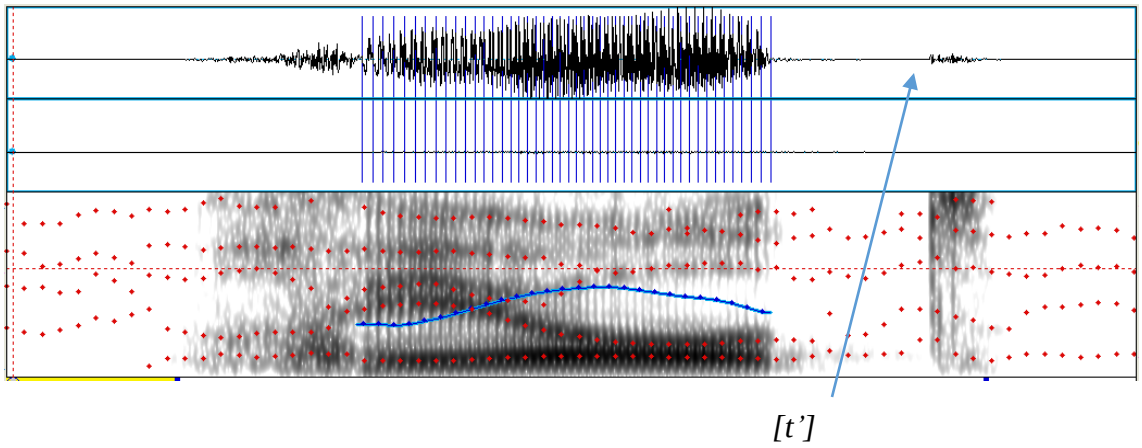

Figure 2. 3: Spectrogram and waveform showing a small sharp 'spike' typical of glottalic initiation in the emphatic /tˤ/ in this token of /xeˈjoː tˤ/ - [xəˈjoːt̪ˤ] 'sewed 3M.SG.PFV'.

Given the previous results, it can be said that the voiceless alveolar emphatic plosive /tˤ/ in Harsusi is realized as a pharyngealized emphatic in all environments except in utterance final or pausal positions where it is glottalized.

Voiceless Velar Glottalized Plosive /k'/

According to Watson and Bellem (2010), the voiceless velar emphatic plosive /kˤ/ in Mahriyot is the only emphatic consonant realized as a glottalized in all phonological environments, while all the other emphatics are pharyngealized. They based their results on acoustic analyses of the recorded data as well as Watson's attempts to produce the various emphatic sounds as glottalized in different positions and recorded the consultants' reactions to those tokens. In terms of the acoustic analyses, Watson and Bellem (2010) looked for a spike in the waveform of the consonants which is typical of glottalic consonants as a result of the glottalic pressure release. In Harsusi, the voiceless velar glottalized plosive /k'/ is the only glottalized phoneme. It can be established as a separate phoneme, as was seen under (Plosives), based on the minimal pair of the words /keˈboːr/ - [kəˑˈboːr] 'said phrase Allah akbar 3M.SG.PFV' and /k'eˈboːr/ - [k'əˑˈboːr] 'buried 3M.SG.PFV'. It can occur word initially, medially and finally and has two allophones which are [k'] and [kˤ]. Below are three figures showing the spectrograms and waveforms of the voiceless velar emphatic plosive /k'/ in word initial, medial and final positions in Harsusi.

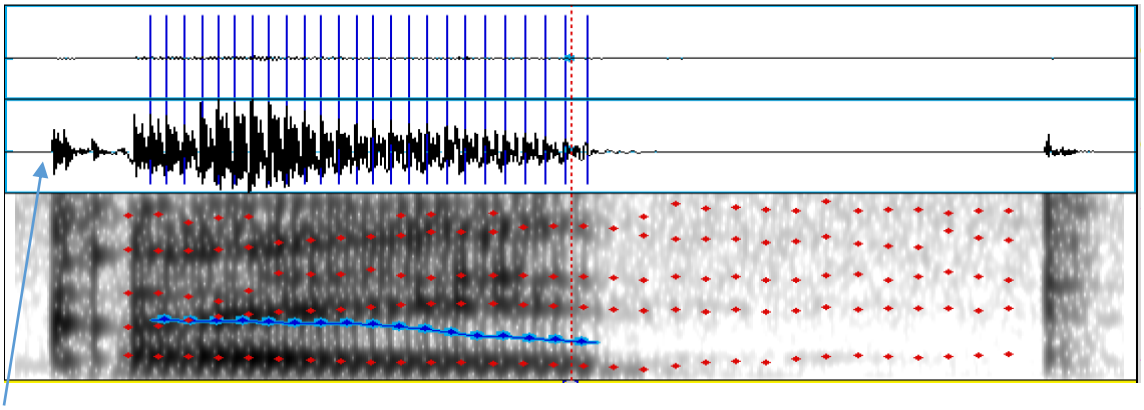

Figure 2. 4: Spectrogram and waveform showing the sharp 'spike' typical of glottalic initiation in the glottalic /k’/ in this token of /k’ajd/ - [ˈk’ạjʈ] 'rope M.SG'.

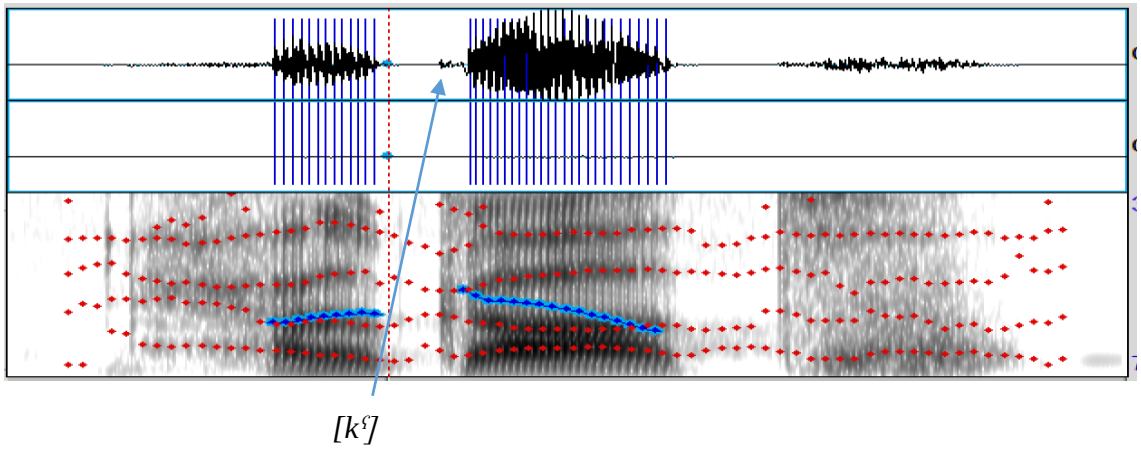

Figure 2. 5: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the glottalic /k’/ in this token of /ħelˈk’ạ:t/ - [ħəɬkˤạʈʰ] 'circle F.SG'.

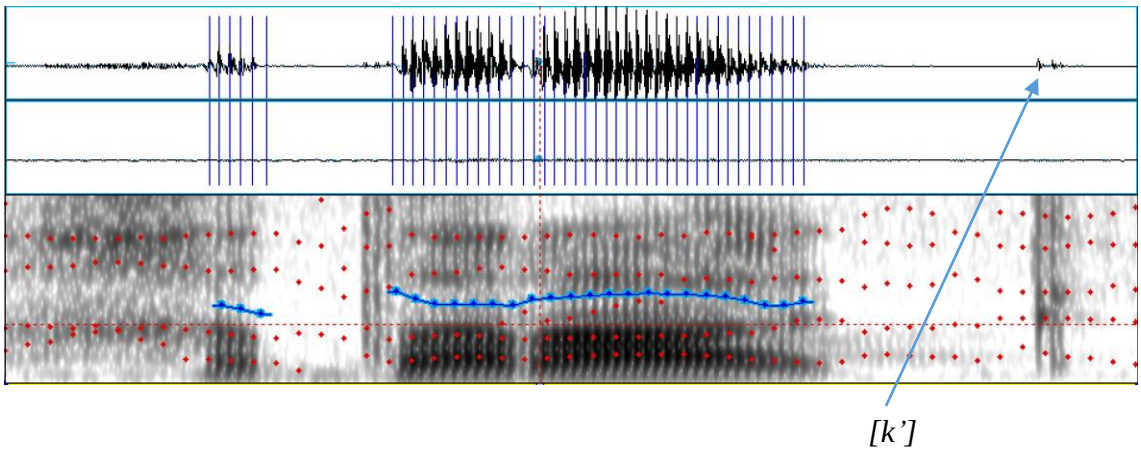

Figure 2. 6: Spectrogram and waveform showing a small 'spike' typical of glottalic initiation in the glottalic /k’/ in this token of /xetˤˈra:k’/ - [xətˤ.ra:k’] 'stick F.SG'.

From the spectrograms and waveforms in figures 2. 4, 2. 5 and 2. 6, it is clear that the voiceless velar emphatic /k’/ in Harsusi exhibits features of glottalized consonants in initial positions and to a lower extent in final positions. Figure 2. 4 shows the ‘spike’ typical of glottalized initiation. Moreover, by looking at the spectrogram in figure 2. 4, it is clear that the initial oral burst release is followed by another glottalized release. By comparison, figure 2. 5 do not show neither the ‘spike’ nor the secondary burst resulting from the glottalized release; however, by checking the F1 and F2 formants of the following vowel, the effect of pharyngealization was clear in a higher F1 and lower F2. In figure 2. 6 where the voiceless velar emphatic /k’/ is in pre-pausal position, a slight ‘spike’ is visible which suggests it might be realized as a glottalized in final positions as well. In addition, by looking at the spectrogram in figure 2. 6, it is clear that the initial oral burst release is followed by another glottalized release. Therefore, it can be concluded that the voiceless velar emphatic plosive /k’/ has two allophones which are /[k’] and [kˤ]. The allophone [kˤ] occurs only word medially as in the word /ħelˈk’a:t/ -

[ħəɬˈkˤaːt̪ʰ] 'circle F.SG', while the allophone [k'] occurs elsewhere. There phonological distribution can be formally stated in Rule 13 below.

Rule 13:

/k'/ ⟶ [kˤ] / #__# , and [k'] / elsewhere

Given the wider distribution of the glottalized allophone [k'] in case of the voiceless velar emphatic /k'/, it can be said that it is underlyingly a glottalized consonant compared to the other sounds in the group of the 'Emphatics' which are not realized as glottalized consonants in all environments.

Voiceless Alveolar Emphatic Fricative /sˤ/

Previous research assumed the voiceless alveolar emphatic fricative /sˤ/ in Harsusi to be a post-glottalized emphatic, as was mentioned above. However, in Mahriyot (Watson & Bellem, 2010) it was found to be a pharyngealized consonant and not a glottalized which is most often found to be predominantly voiced. The voiceless alveolar emphatic fricative /sˤ/ is not glottalized in Harsusi, but rather a pharyngealized consonant. It is a separate phoneme given the minimal pair of the words /seˈboːr/ - [səˈboːr] 'scouted 3M.SG.PFV' and /sˤeˈboːr/ - [sˤəˈboːr] 'waited 3M.SG.PFV', as was seen above under (Fricatives). It can occur either word initially, medially, or finally and it has only one allophone which is [sˤ] that occurs in all environments. Below are the figures showing the waveforms and spectrograms of the voiceless alveolar emphatic fricative /sˤ/ in Harsusi words in initial, medial and final positions.

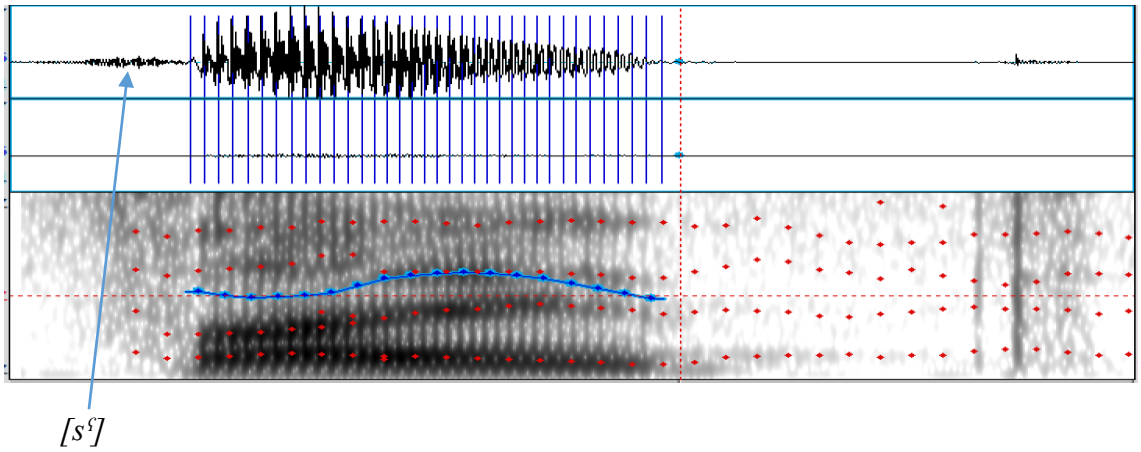

Figure 2. 7: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /sˤ/ in this token of /sˤajd/ - [ˈsˤạjʈ] 'fish M.SG'.

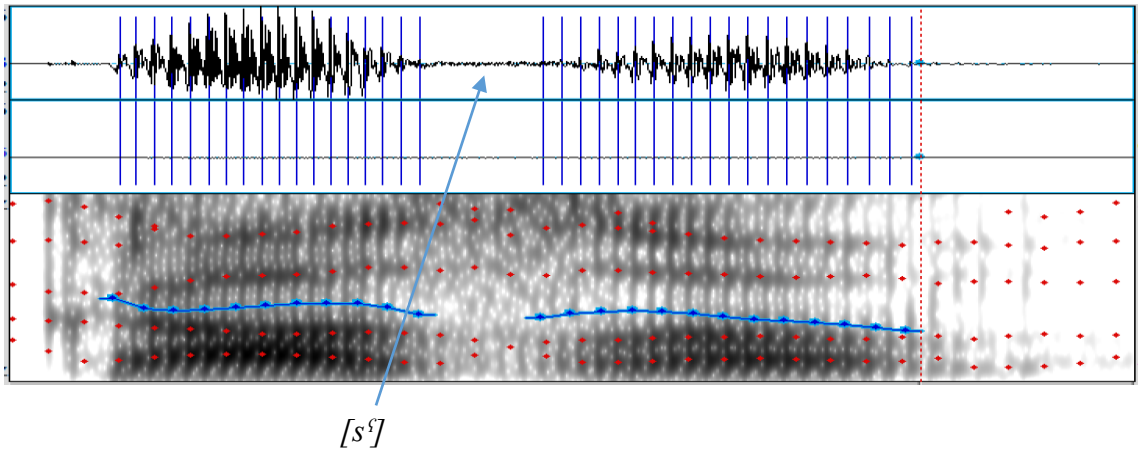

Figure 2. 8: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /sˤ/ in this token of /ˈk'asˤem/ - ['k'a.sˤəm] 'cold M.SG'.

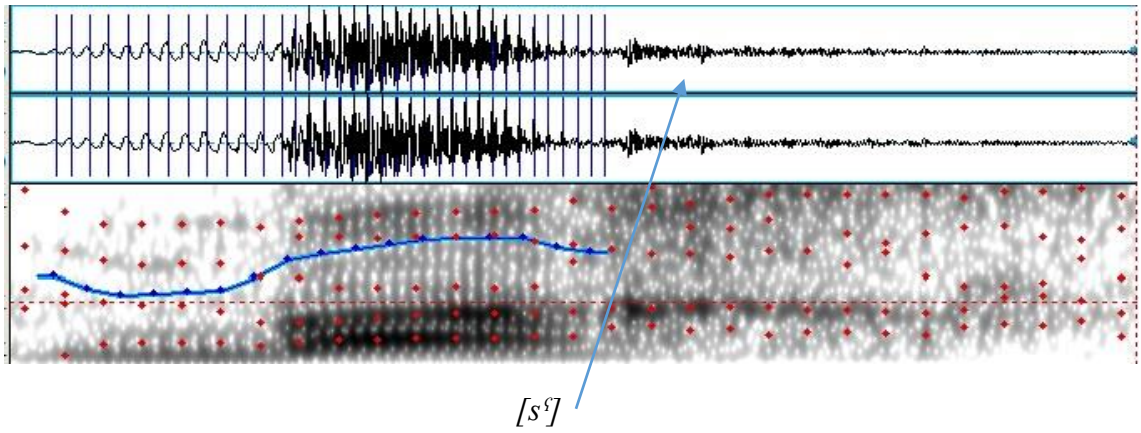

Figure 2. 9: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /sˤ/ in this token of /ˈbaxsˤ/ - ['baxsˤ] 'severe pain M.SG'

All the figures 2. 7, 2. 8 and 2. 9, show the voiceless alveolar emphatic fricative /sˤ/ with no 'spike' which is typical for glottalic initiation as was found by Watson and Bellem (2010). By looking at the spectrograms in all the previous figures, no bursts which are typical of glottalic release can be seen. Moreover, the figures 2. 7 and 2. 8 show that the voiceless alveolar emphatic fricative /sˤ/ in Harsusi is voiceless whether in initial position or medially in intervocalic positions as can be seen in figure 2. 8. Thus, unlike Mahriyot, the voiceless alveolar emphatic fricative /sˤ/ in Harsusi is found to be predominantly voiceless in different phonological environments.

Voiceless Palato-alveolar Emphatic Fricative /ʃˤ/

The voiceless palato-alveolar emphatic fricative /ʃˤ/ does not occur in many words in Harsusi. Johnstone (1977) in his lexicon of Harsusi language also mentioned the scarcity of occurrence of this consonant. So far in the data, it occurred only in four words which are given in table 2. 21 below.

Phoneme	Example
/ʃˤ/	/ʃˤefeˈruːt/ - [ʃˤə.fə.ˈruːt̪ʰ] ‘bird M.SG’ /k’eˈʃˤuːb/ - [k’ə.'ʃˤu̟ːb] ‘cut 3M.SG.PFV’ /ħeˈʃˤaːbaː/ - [ħə.ˈʃˤa̟ː.baː] ‘fingers F.PL’ /ʃˤeˈroːm/ - [ʃˤə.'roːm] ‘slapped 3M.SG.PFV’

Table 2. 21: Voiceless palato-alveolar emphatic /ʃˤ/ examples

It can be established as a separate phoneme in Harsusi given the near minimal pair of the words /ʃˤeˈroːm/ - [ʃˤə.'roːm] ‘slapped 3M.SG.PFV’ and /sˤeˈroːmeh/ - [sˤə.'roː.məh] ‘now ADV’. Watson and Bellem (2010) found this voiceless palato-alveolar emphatic fricative /ʃˤ/ in Mahriyot to be a pharyngealized consonant that can be partially or fully voiced in intervocalic positions. Below are the figures showing the waveforms and spectrograms of the voiceless palato-alveolar emphatic fricative /ʃˤ/ in Harsusi words in initial and medial positions.

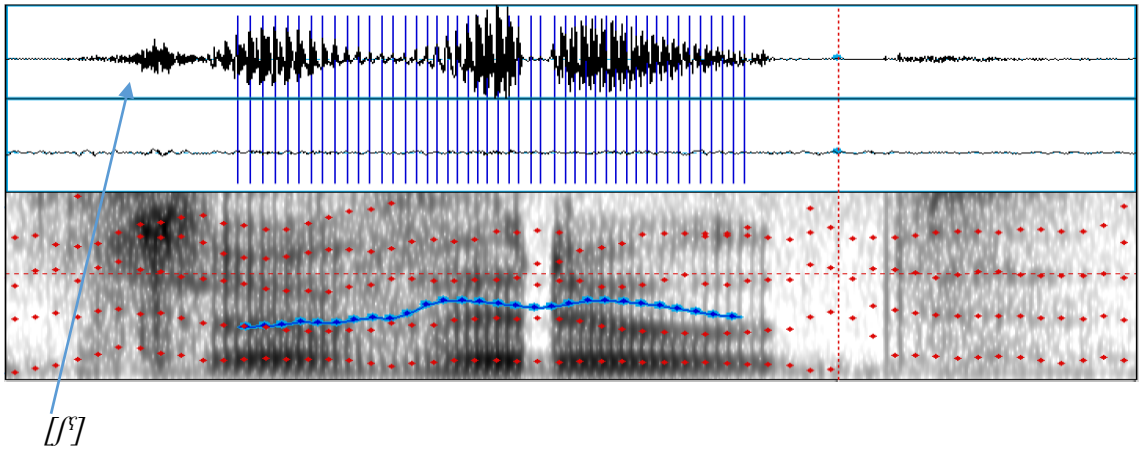

Figure 2. 10: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /ʃˤ/ in this token of /ʃˤeferuːt/ - [ʃˤə.fə.ˈruːt̪ʰ] 'bird M.SG'.

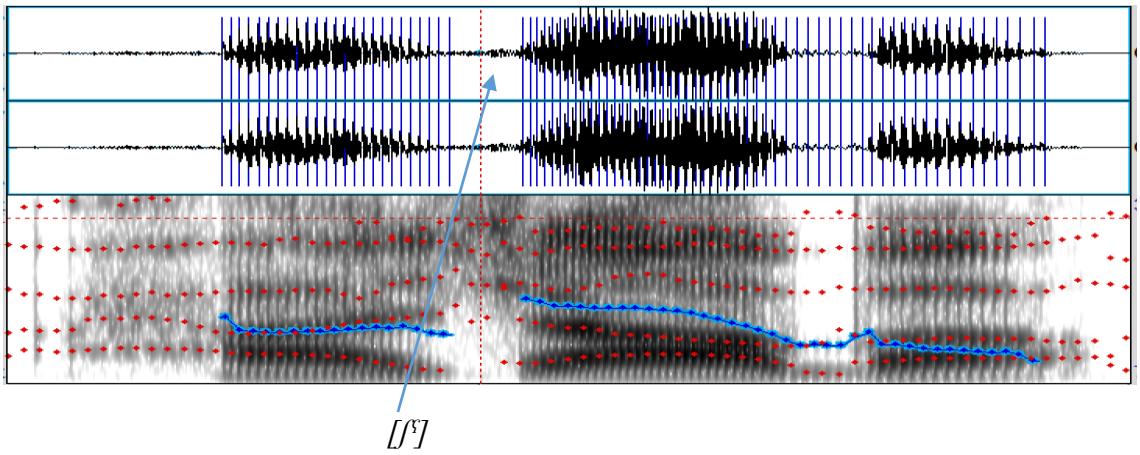

Figure 2. 11: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /ʃˤ/ in this token of /ħeʃˤaːbaː/ - [həˈʃˤạːbaː] 'fingers F.PL'.

From figure 2. 10 it is clear that the voiceless palato-alveolar emphatic fricative /ʃˤ/ in Harsusi is not realized as a glottalized, but rather as a pharyngealized fricative. The waveform does not show a sharper or higher 'spike' which can indicate a glottalic initiation. Also, by looking at the spectrogram, it can be seen that the articulation of the sound does not include instances of any closure or burst to indicate glottalized features and energy can be seen at all the frequencies throughout the articulation duration. In addition, figure 2. 11 shows that the voiceless palato-alveolar emphatic fricative /ʃˤ/ in Harsusi is mostly voiceless unlike Watson and Bellem's (2010) results of this consonant in Mahriyot where it was found to be predominantly voiced intervocalically. By looking at the waveforms in figures 2. 10 and 2. 11, it can be concluded that the voiceless palato-alveolar emphatic fricative /ʃˤ/ has only one allophone which is [ʃˤ] and is predominantly voiceless in Harsusi except for minor voicing assimilation at the start from the preceding vowel.

Voiceless Lateral Emphatic Fricative /ɬˤ/

The voiceless lateral emphatic fricative /ɬˤ/ in Harsusi was assumed to be a voiced lateral fricative /ɮ/ by Johnstone (1977). Watson (2012 : 13) described it in Mehri as an emphatic lateral fricative which is realized as a pharyngealized emphatic, but often has a lateral sonorant offglide. In Harsusi, it can be established as a separate phoneme given the minimal pair of the words /jeɬbo:b/ - [jiɬˈbo:p] 'climb 3M.SG.IPFV' and /jeɬˤbo:b/ - [jiɬˤˈbo:p] 'chat 3M.SG.IPFV' as was shown under (Laterals) above. Regarding its pharyngealized nature, the F1 and F2 formants of the following vowel were checked. The F1 was found to be higher and the F2 was found to be lower when the vowel followed the voiceless lateral emphatic fricative /ɬˤ/ compared to other non-emphatic consonants. Below are the figures showing the waveforms and spectrograms of the voiceless lateral emphatic fricative /ɬˤ/ in Harsusi words in initial, medial and utterance final or pausal positions.

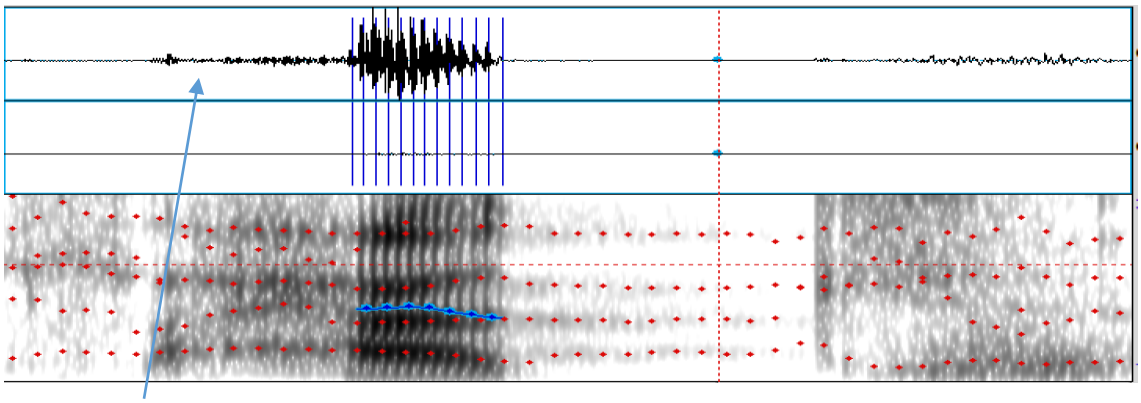

Figure 2. 12: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /ɬˤ/ in this token of /ˈɬˤħak/ - [ˈɬˤhakʰ] 'laughed 3M.SG.PFV'.

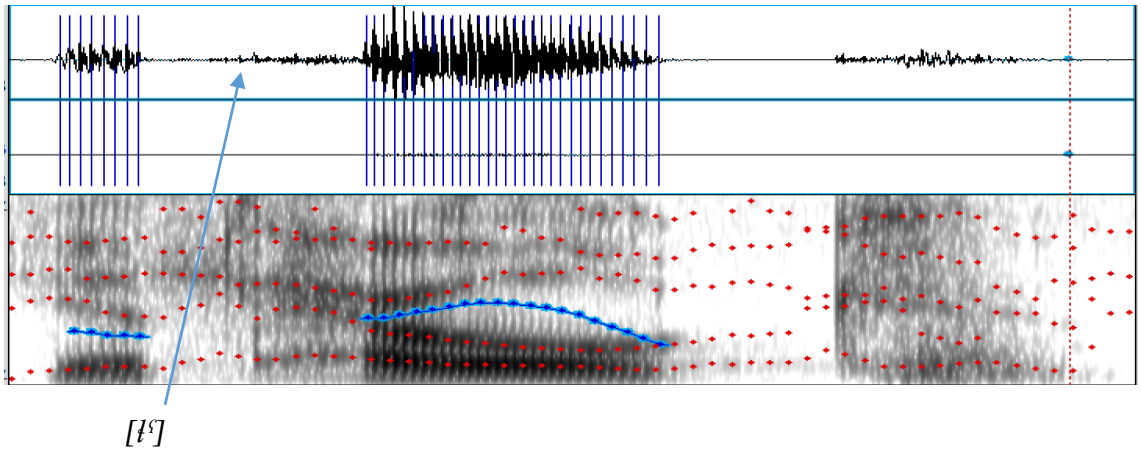

Figure 2. 13: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /ɬˤ/ in this token of /jeɬˤˈho:k/ - [jeɬˤ.ˈħo:kʰ] 'laughs 3M.SG.IPFV'.

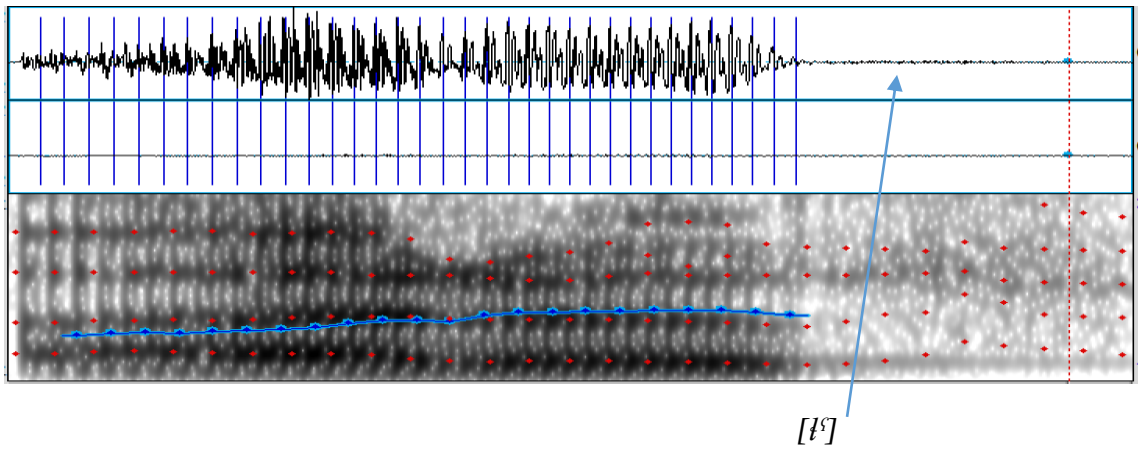

Figure 2. 14: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /ɬˤ/ in this token of /ˈʔa:reɬˤ/ - ['ʔa:.rəɬˤ] 'wide M.SG'.

The figures 2. 12-14 show clearly that the voiceless lateral emphatic fricative /ɬˤ/ is neither glottalized nor voiced in Harsusi. Figure 2. 12 shows the lateral emphatic fricative as a fully voiceless consonant word initially where it is followed by the voiceless pharyngeal fricative /ħ/. In both figures 2. 13 and 2. 14, the voiceless lateral emphatic

fricative /ɬˤ/ is preceded by a vowel; nonetheless, in figure 2. 13 it is followed by the voiceless pharyngeal fricative /ħ/ and in figure 2. 14 it is in utterance final position. In both previous figures we can see that the voiceless lateral emphatic fricative /ɬˤ/ in Harsusi is predominantly voiceless except voicing assimilation at the very start where the frication starts.

However, in intervocalic positions were the voiceless lateral emphatic fricative /ɬˤ/ is found between two vowels, we can see that it can be fully voiced as figures 2. 15 and 2. 16 show below. The blue lines of glottalic pulses show clearly the voicing assimilation I intervocalic position of the voiceless lateral emphatic fricative /ɬˤ/ which is realized as a [ɮˤ].

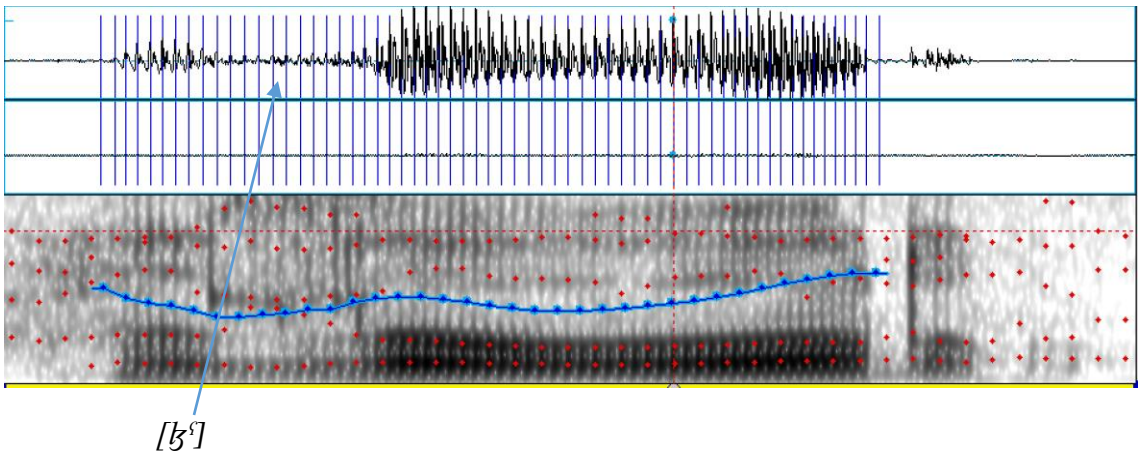

Figure 2. 15: Spectrogram and waveform showing the blue lines of glottalic pulses typical of voiced consonants in the emphatic /ɬˤ/ in this token of /heˈɬˤoːr/ - [həˈɮˤoːr] 'green M.SG'.

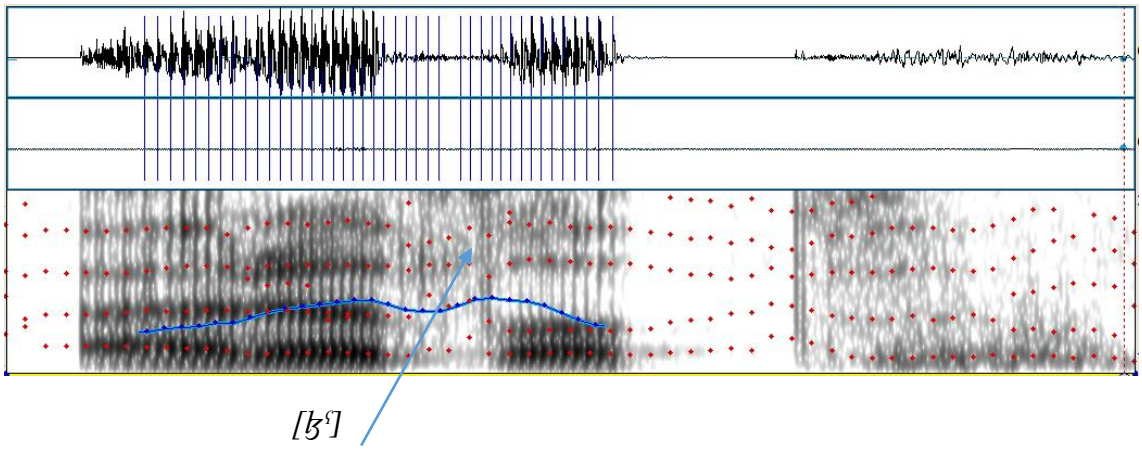

Figure 2. 16: Spectrogram and waveform showing the blue lines of glottalic pulses typical of voiced consonants in the emphatic /ɬˤ/ in this token of /ˈʔaːre ɬˤet/ - [ˈʔaːːrəˌɮˤəʇʰ] 'green M.SG'

Therefore, it can be concluded that the voiceless lateral emphatic fricative /ɬˤ/ in Harsusi has two different allophones which are [ɮˤ] and [ɬˤ]. The allophone [ɮˤ] occurs only intervocalically as in the word /heˈɬˤoːr/ - [həˌˈɮˤoːr] 'green M.SG', while the allophone [ɬˤ] occurs elsewhere. We can formulate a voicing rule in Harsusi for the voiceless lateral emphatic fricative /ɬˤ/ as in Rule 14 below.

Rule 14:

/ɬˤ/ [-Voice] ⟶ [ɮˤ] [+Voice] / V__V, and [ɬˤ] [-Voice] / elsewhere

The previous rule indicates that in case of the voiceless lateral emphatic fricative /ɬˤ/, the allophone [ɮˤ] can occur only intervocalically between two vowels as a result of voicing assimilation and the allophone [ɬˤ] occurs elsewhere.

Voiced Interdental Emphatic Fricative /ðˤ/

Johnstone (1977, p. xii) described the emphatic interdental fricative /ðˤ/ in Harsusi as a voiced consonant that has a partially voiceless variant in initial position. Swiggers (1981, p. 361) described it as a voiced emphatic. In Mahriyot, Watson and Bellem (2010) stated that the emphatic interdental fricative /ðˤ/ shows substantially less voicing. It can be established as a separate phoneme in Harsusi given the minimal pair of the words /ðeˈfiːr/ - [ðəˈfiːr] 'type of plant used as medicine M.SG' and /ðˤefiːr/ - [ðˤəˈfiːr] 'fingernail M.SG' as was shown under (Fricatives) above. Below are the figures showing the waveforms and spectrograms of the voiced interdental emphatic fricative /ðˤ/ in Harsusi words in initial and utterance final positions. The voiced interdental emphatic fricative /ðˤ/ has not been attested in medial positions in the data.

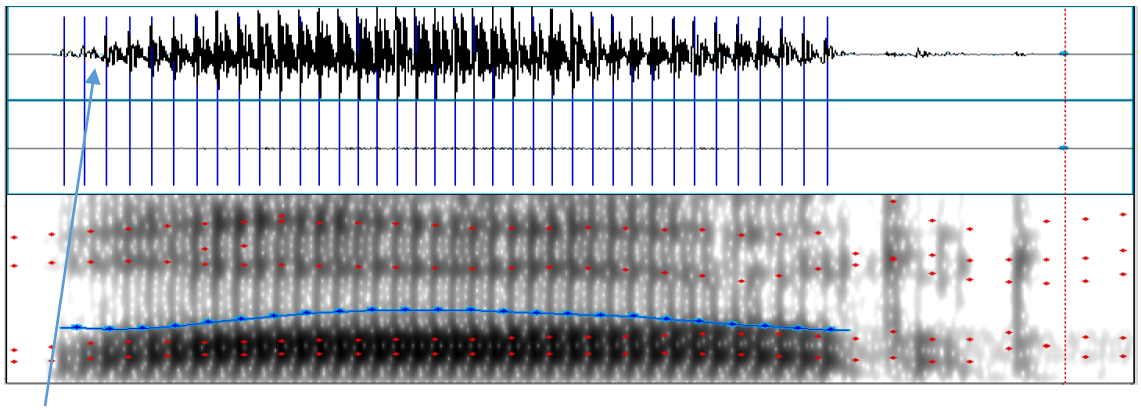

Figure 2. 17: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /ðˤ/ in this token of /'ðˤaːr/ - ['ðˤaːr] 'on'.

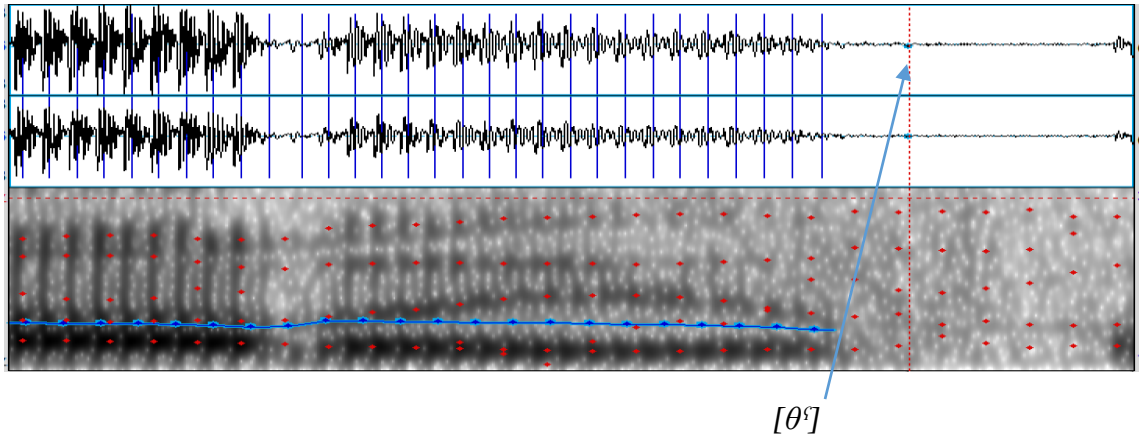

Figure 2. 18: Spectrogram and waveform not showing the sharp 'spike' typical of glottalic initiation in the emphatic /ðˤ/ in this token of /ʔaːˈ.reːðˤ/ - [ʔaːˈ.reːθˤ] 'male goat M.SG'.

As figure 2. 17 shows, the voiced interdental emphatic fricative /ðˤ/ in Harsusi is fully voiced word initially in prevocalic position. Figure 2. 18 shows that it can be voiceless and realized more like [θˤ] in pausal positions; however, devoicing of final voiced phonemes affects all consonants in Harsusi and is not an exclusive trait of the voiced interdental emphatic fricative /ðˤ/ as will be shown below in (2.1.3). Thus, it can be concluded that the voiced interdental emphatic fricative /ðˤ/ in Harsusi has two different allophones which are [ðˤ] and [θˤ]. The allophone [θˤ] occurs only in utterance final positions as in the word /ʔaːˈreːðˤ/ - [ʔaːˈ.reː θˤ] 'male goat M.SG', while the allophone [ðˤ] occurs elsewhere. We can formulate a devoicing rule in Harsusi for the voiced interdental emphatic fricative /ðˤ/ as in rule 15 below.

Rule 15:

/ðˤ/ [+Voice] → [θˤ] [-Voice] / __#, and [ðˤ] [+Voice] / elsewhere

The previous rule indicates that in case of the voiced interdental emphatic fricative /ðˤ/, the allophone [θˤ] can occur only in final positions as a result of devoicing in utterance final positions and the allophone [ðˤ] occurs elsewhere.

In summary, the results from the previous sections (2.1.2.1 - 2.1.2.6) suggest that not all the emphatics in Harsusi have a glottalized realization. Table 2. 22 below shows examples of the allophones of these phonemes in word initial, medial and utterance final positions.

Phoneme	**Positions**		
	Initial	**Medial**	**Final**
/tˤ/	/ˈtˤoːb/ - [ˈt̪ˤo̞ːp] ‘type of plant F.SG’	/jeˈloːtˤem/ - [ji.ˈloː.t̪ˤəm] slap 3M.SG.IPVF’	/ˈmatˤtˤ/ - [ˈmat̪’ː] ‘pull 3M.SG.PFV’
/k’/	/ˈk’ajd/ - [ˈk’a̟jt̪] ‘rope M.SG’	/ħelk’aːt/ - [ħəɬːkˤa̟ːt̪ʰ] ‘circle F.SG’	/xetˤˈraːk’/ - [xətˤ.raːk’] ‘stick F.SG’
/ðˤ/	/ðˤefiːr/ - [ðˤəˈfiːr] ‘fingernail M.SG’	/jeðˤoːlaː/ - [jiˈðˤo̞ː.laː] ‘limp 3M..SG.IPFV’	/ʔaːˈreːðˤ/ - [ʔaː.ˈreθˤ] ‘male goat M.SG’
/sˤ/	/ˈsˤajd/ - [sˤajt̪] ‘fish M.SG’	/ˈk’asˤem/ - [ˈk’a.sˤəm] ‘cold M.SG’	/ˈbaxsˤ/ - [ˈbaxsˤ] ‘pain M.SG’
/ʃˤ/	/ʃˤefeˈruːt/ - [ʃˤə.fə.ˈruːt̪ʰ] ‘bird M.SG’	/ħeˈʃˤaːbaː/ - [ħəˈʃˤa̟ː.baː] ‘fingers F.PL’	Not Attested
/ɬˤ/	/ˈɬˤa.her/ - [ˈɬˤa.hər] ‘back M.SG’	/heˈɬˤoːr/ - [həˈɮˤoːr] ‘green M.SG’	/ˈʔaːreɬˤ/ - [ˈʔaː.rəɬˤ] ‘wide ADJ’

Table 2. 22: 'Emphatic' consonants allophones in initial, medial and utterance final positions

All the phonemes grouped as emphatics affect their surrounding sounds. In the presence of an emphatic sound, the following vowel’s F1 and F2 formants get affected. The F1 formant raises and the F2 formant lowers when the vowel is preceded by an emphatic sound compared to a non-emphatic sound. The acoustic analysis showed that only the voiceless velar emphatic plosive /k’/ is realized as a glottalized. In addition, the voiceless alveolar emphatic plosive /tˤ/ seem to be slightly glottalized in utterance final positions. In other positions the voiceless velar emphatic plosive /k’/ and the voiceless

alveolar emphatic plosive /tˤ/ are not realized as glottalized at least in the data found so far. Similarly, all the other emphatic sounds in Harsusi including the voiceless alveolar emphatic fricative /sˤ/, voiceless palato-alveolar emphatic fricative /ʃˤ/, voiceless lateral emphatic fricative /ɬˤ/ and voiced interdental emphatic fricative /ðˤ/ are not realized as glottalized in any environment.

Therefore, it can be concluded that all the sounds grouped as 'Emphatics' in Harsusi are underlyingly pharyngealized except the voiceless velar emphatic plosive /k'/ which is glottalized. However, based on their behavior and effect on surrounding vowels, all the sounds grouped under 'Emphatics' can be considered as a phonemic class in Harsusi.

In terms of voicing, the voiceless alveolar emphatic fricative /sˤ/ and the voiceless palato-alveolar emphatic fricative /ʃˤ/ get slightly voiced at the initiation of frication when preceded by a vowel but remain predominantly voiceless. On the other hand, the voiceless lateral emphatic fricative /ɬˤ/ gets fully voiced in intervocalic positions. The voiced interdental emphatic fricative /ðˤ/ is fully voiced in initial positions, but gets devoiced in utterance final positions similar to other voiced consonants in similar environments.

The Phonetic Realization of Non-Emphatic Plosives

As was noted above, Harsusi has a three-way distinction between the plosives, fricatives and laterals as it has voiced, voiceless and emphatic phonemes. Watson and Bellem (2010, p.352) stated that the voiced non-continuant obstruent whether emphatic or not are devoiced in final positions and released on a glottalic airstream. The voiced plosives of Harsusi can get devoiced in utterance final positions; however, they are not

glottalic and rather heavily released in utterance final positions. The devoicing of the voiced non-continuant obstruent sounds can be seen in the near minimal pairs in table 2. 23 below.

Phoneme	**Pre-pausal**	**Final**
/b/	[ðˤạrb - i] 'twig M.SG – POSS 1SG.M'	[ðˤạrp] 'twig M.SG'
/d/	[gə.leːd - i] 'skins M.PL – POSS 1SG.M'	[gə.leːt] 'skin M.PL'
/g/	[ˈʁạjg - i] 'man M.SG – POSS 1SG.M'	[ˈʁạjk] 'man M.SG'

Table 2. 23: Devoicing of voiced plosives in Harsusi

As can be seen in the table above, the voiced bilabial stop /b/, the voiced alveolar stop /d/ and the voiced velar stop /g/, all get devoiced in final positions. Therefore, we can formulate a general devoicing rule of Harsusi plosives, which were discussed earlier under (Plosives), as follows:

Rule 16:

/C/ [+Voice] → /C/ [-Voice] / __#, and /C/ [+Voice] / elsewhere

The previous rule indicates that in case of the voiced plosives, their devoiced allophones occur only in utterance final positions and they are voiced elsewhere.

However, being released on a glottalic airstream was not found in all of the data from all speakers. Moreover, one token was found by one speaker where the voiced bilabial stop /b/ was not devoiced and not released in utterance final position as figure 2. 19 shows below. It should be noted, however, that the speaker was a young university educated male between 20-25 years old. The speaker was a bilingual of both Arabic and

Harsusi, but he did reside in Arabic speaking places such as Muscat and Adam for long periods in his life.

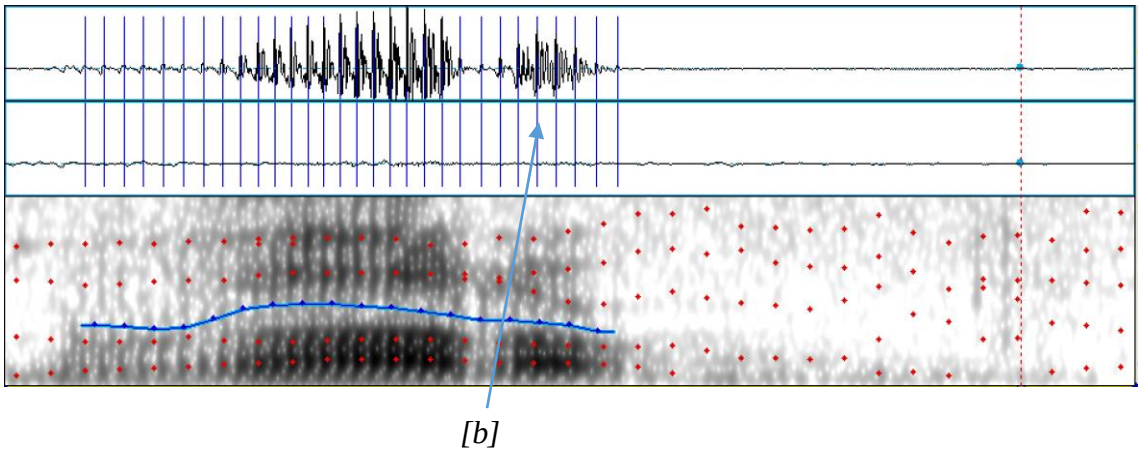

Figure 2. 19: Spectrogram and waveform showing the voicing and unrelease of the voiced bilabial stop /b/ in final position in this token of /ˈðˤarb/ - [ˈðˤa̤rb̤] 'twig M.SG'.

On the other hand, both figures 2. 20 and 2. 21 below show that the bilabial stop /b/ is only voiced at the initiation of the oral closure and is devoiced throughout until the release of the oral burst. In addition, a slight spike is also seen in the waveform, but this can be as a result of the oral burst during the plosive release.

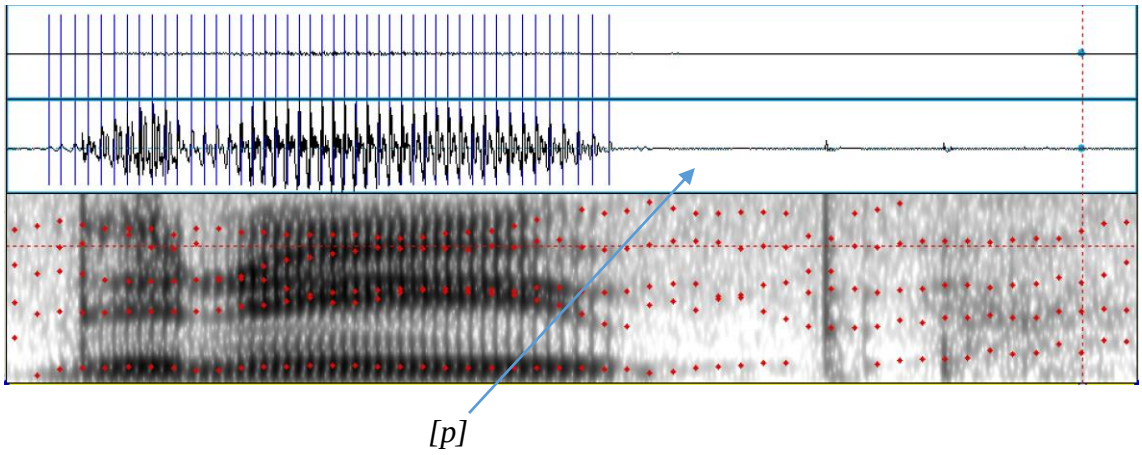

Figure 2. 20: Spectrogram and waveform showing the sharp 'spike' typical of glottalic initiation in the voiced bilabial stop /b/ in final position in this token of /ðeˈneːb/ - [ðəˈneːp] 'tail M.SG'.

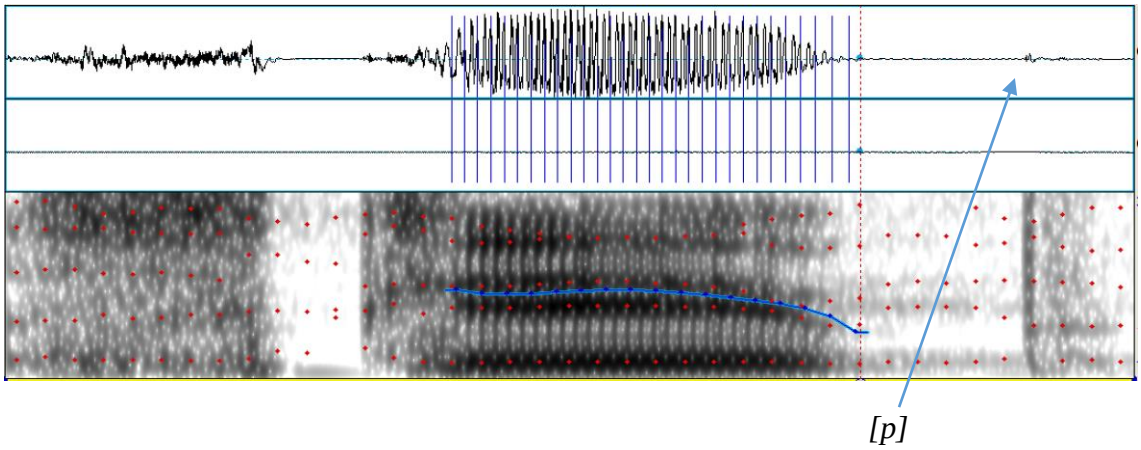

Figure 2. 21: Spectrogram and waveform showing short frication noise after oral burst of final /b/ in /ʔesˈkeːb/ - [ʔəsˈkeːp] 'pour 2M.SG.IMP'.

Other voiced consonants are also found to be devoiced in utterance final positions such as the voiced alveolar stop /d/ and the voiced velar stop /g/ as can be seen in figures 2. 22 and 2. 23 below. However, it should be noted that the oral burst is followed by a shorter frication in case of the devoicing of voiced stops in utterance final position as can

be seen in figures 2. 20, 2. 21, 2. 22 and 2. 23 compared to the frication after final voiceless stops such as the voiceless alveolar and velar stops /t/ and /k/, respectively, as will be seen below. Therefore, it can be concluded that the devoiced plosives in utterance final positions are not aspirated similar to voiceless plosives in the same position.

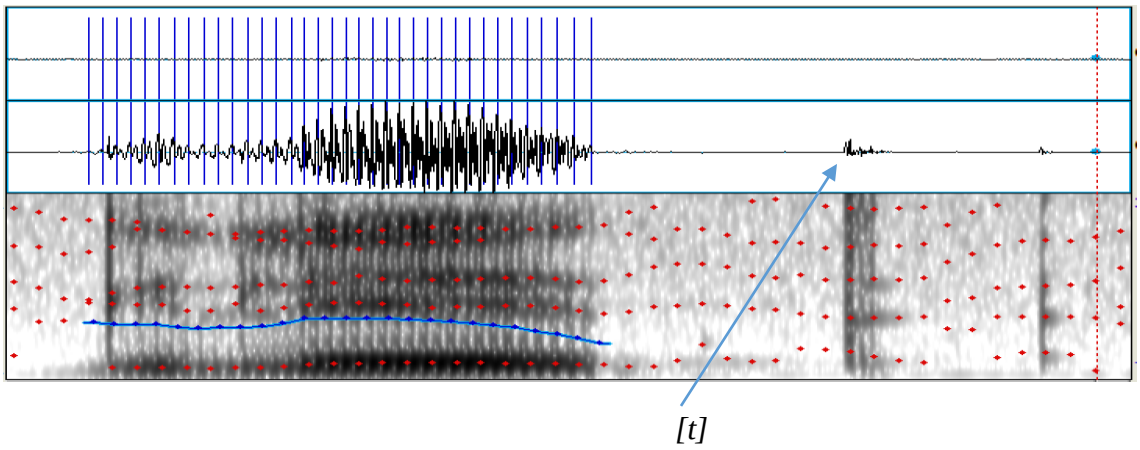

Figure 2. 22: Spectrogram and waveform showing short frication noise after oral burst of final /d/ in /geˈle:d/ - [gə.le:t] 'skin M.PL'.

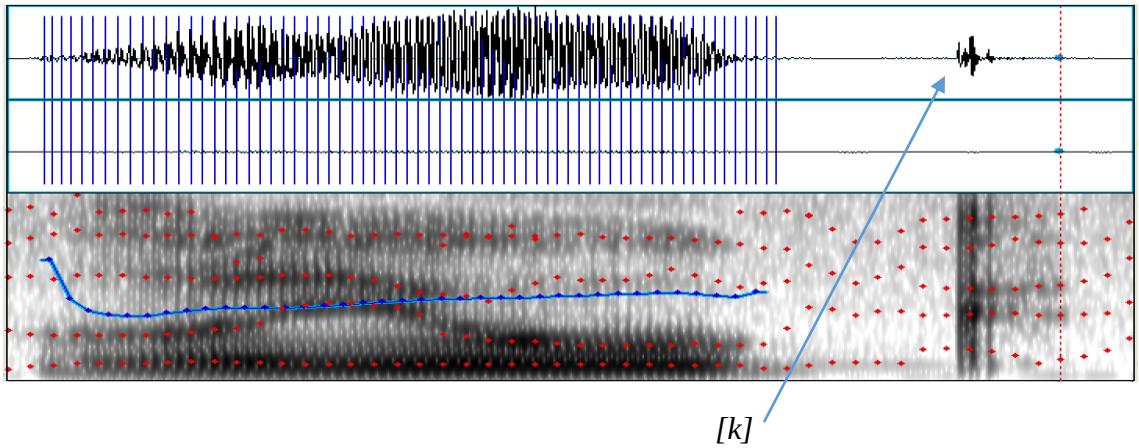

Figure 2. 23: Spectrogram and waveform showing short frication noise after oral burst of final /g/ in /ˈʁajg/ - [ˈʁạik] 'man M.SG'.

In terms of aspiration, all the literature so far states that the voiceless plosives /t/ and /k/ in MSA languages are aspirated in final positions (Johnstone, 1977; Swiggers, 1981; Watson & Bellem, 2010). The data gathered on Harsusi shows that both non-emphatic voiceless plosives of Harsusi /k/ and /t/ are aspirated in utterance final positions. However, in other positions, whether initial or medial, the aspiration is not as significant as in the final position. Figures 2. 24 and 2. 25 below show the aspiration in /t/ and /k/, respectively, in utterance final positions where the aspiration noise can be clearly seen in the spectrograms in terms of a frication after the oral burst.

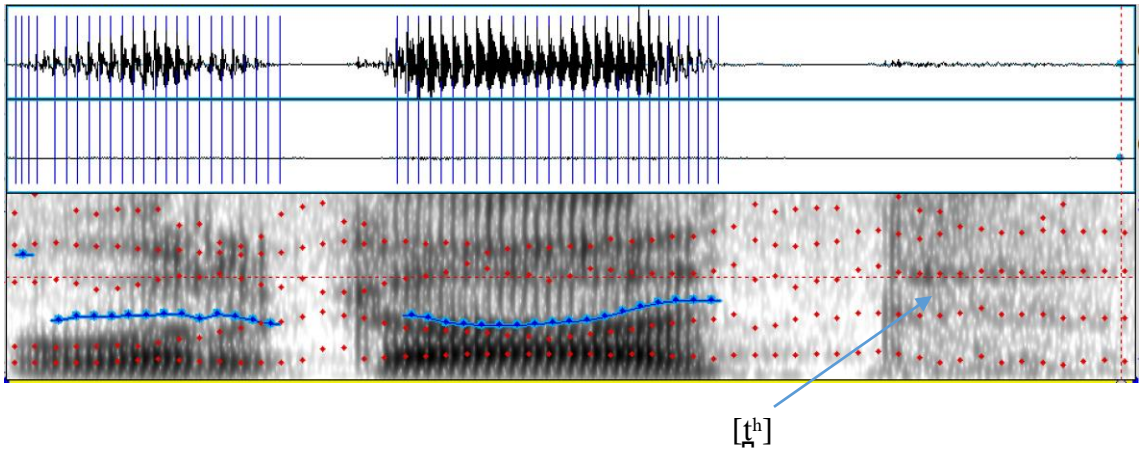

Figure 2. 24: Spectrogram and waveform showing the frication noise after oral burst of final /t/ in /werˈkʾa:t/ - [wərˈkˤa:t̪ʰ] 'leaf F.SG'.

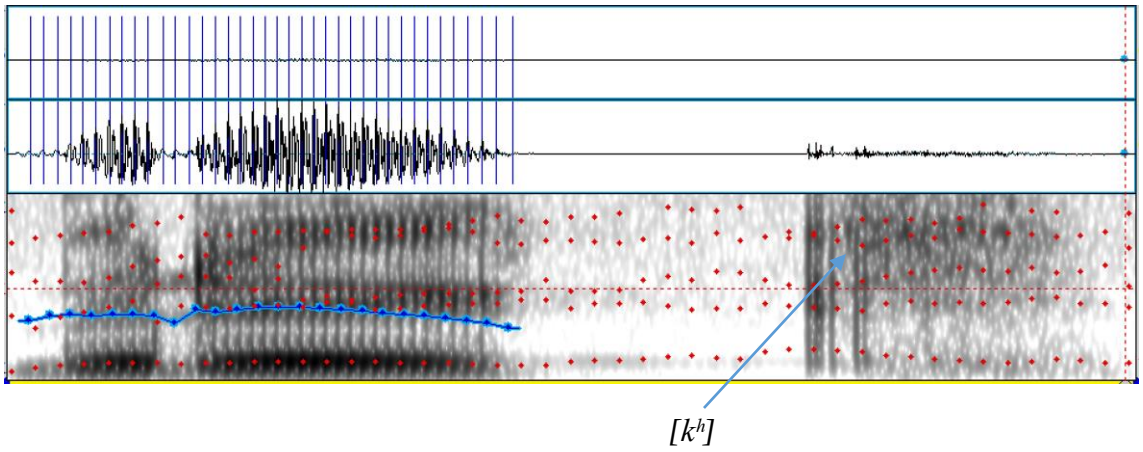

Figure 2. 25: Spectrogram and waveform showing the frication noise after oral burst of final /k/ in /beˈreːk/ - [bəˈreːkʰ] 'knees F.PL'.

Therefore, we can formulate an aspiration rule in Harsusi for voiceless stops as follows:

Rule 17:

/C/ [+Stop , -Voice , -Aspirated] ⟶ /C/ [+Aspirated] / __#

The previous rule indicates that in case of the voiceless plosives, their devoiced allophones occur only in utterance final positions.

In comparison, when both /t/ and /k/ are found word initially or medially, they do not show strong aspiration as in the final position. Figures 2. 26 and 2. 27 below show /t/ in medial position and /k/ in initial and medial positions, respectively. It can be seen in both figures that both voiceless non-emphatic plosives /t/ and /k/ do not show strong aspiration when in initial or medial positions.

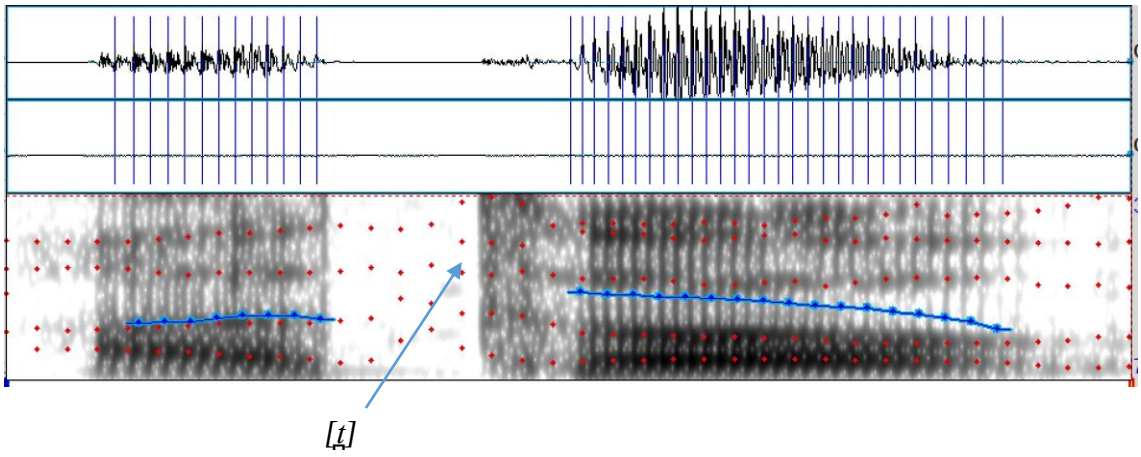

Figure 2. 26: Spectrogram and waveform showing short frication noise after oral burst of medial /t/ in /ʔeˈto:m/ - [ʔəˈt̪o:m] 'you 2M.PL'.

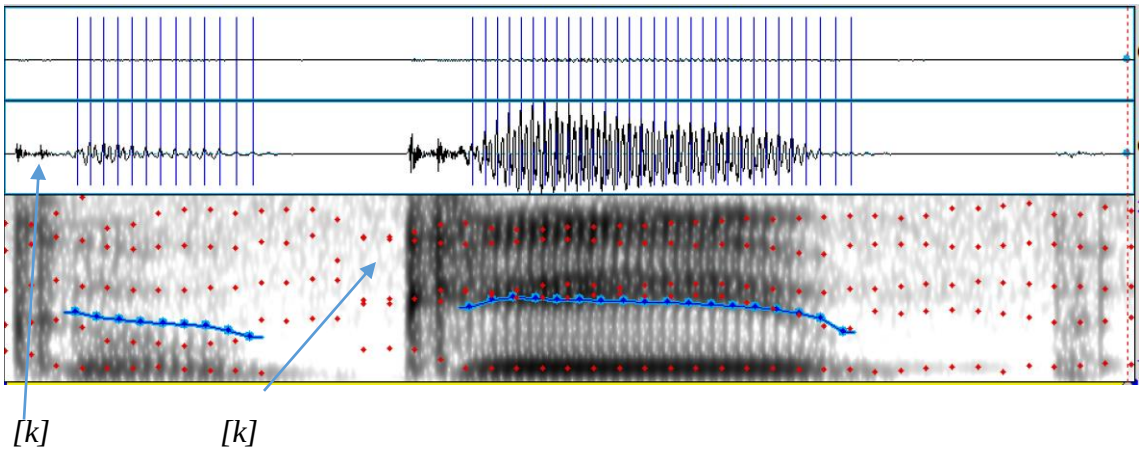

Figure 2. 27: Spectrogram and waveform showing short frication noise after oral burst of initial and medial /k/ in /kebˈki:b/ - [kəbˈki:p] 'star F.SG'.

To conclude, in utterance final positions, the voiced consonants in Harsusi get devoiced. The voiced plosives such as: the bilabial /b/, the alveolar /d/ and the velar /g/ are devoiced in utterance final positions and heavily released; however, they are not glottalized in this position. As was seen under (The Phonetic Realization of 'Emphatics'), only the emphatic plosives such as: the voiceless velar emphatic plosive

/k’/ and the voiceless alveolar emphatic plosive /tˤ/ are glottalized in utterance final positions. The voiceless plosives such as: the velar /k/ and the alveolar /t/ are aspirated in utterance final positions and their aspiration in other places is not strong.

The Glottal /ʔ/ and the Pharyngeal /ʕ/

This section looks more in depth at the glottal stop /ʔ/ and the voiced pharyngeal fricative /ʕ/ since the data show that the voiced pharyngeal fricative /ʕ/ changed into a voiceless glottal stop /ʔ/ in Harsusi which in turn is not realized as a glottal stop in all environments. The section first lays out the different instances where the voiced pharyngeal fricative /ʕ/ was attested and then shows how the influence of Arabic language was checked. Finally, it looks at the glottal stop /ʔ/ and its realization in different contexts.

The voiced pharyngeal fricative /ʕ/ does not occur very frequently in Harsusi. The only attested positions in which it was found in the data were word initial and word medial positions. However, from the data collected, it occurs mostly in the speech of the younger generation and in words which are also found in Arabic as in /ˈʕiːd/ ‘Eid M.SG’ and /ʃeˈʕiːr/ ‘barley M.SG’. Another interesting fact about the voiced pharyngeal fricative /ʕ/ is that it is found only in nouns and adjectives, but not verbs. In nouns and adjectives, it was found both in initial and medial positions, but not in final. The table below shows the different examples where the voiced pharyngeal /ʕ/ was attested.

Phoneme	Initial	Medial
/ʕ/	/ʕajˈnuːnet/ - [ʕa̪jˈnuː.nət̪] ‘little’	/sˤaːˈʕeːt/ - [sˤa̪ː.ˈʕajt̪] or [sˤa̪ː.ˈʔajt̪] ‘nine F.SG’ /meʕˈjoːn/ - [mə.ʕ.ˈjoːn] or [mə.ʔ.ˈjoːn] ‘intestines F.PL’

Table 2. 24: Voiced pharyngeal /ʕ/ in initial and medial positions

As can be seen in table 2. 24 above, it was found in initial position in one word which is /ʕajˈnuːnet/ - [ʕa̪jˈnuː.nət̪] ‘little’. In medial position, it was found in two words only; however, the same words were attested with a glottal stop /ʔ/ as well as in: /sˤaːˈʔeːt/ - [sˤa̪ː.ˈʔajt̪] ‘nine F.SG’ and /meʔˈyoːn/ - [mə.ʔ.ˈjoːn] ‘intestines F.PL’. Thus, it can be concluded that the voiced pharyngeal fricative /ʕ/ is substituted by the glottal stop /ʔ/ in Harsusi and its occurrence in some tokens, especially of the younger generation, is probably due to Arabic language influence.

The substitution of the voiced pharyngeal fricative /ʕ/ into a glottal /ʔ/ can also be proven by comparison and based on historical evidence. Kogan (2011) reconstructs the Proto-Semitic pharyngeal fricative */ʕ/ using the following data:

* ʕaθ’m- ‘bone’ > Akk. es’emtu, Ugr. ʕθ’m , Hbr. ʕa̪s’a̪m, Syr. ʕat’ma:, Arb. ʕað’m-, Gez. ʕas’m, Amh. aṭənt, Mhr. ʔaːð’əmeːt ‘back’ (Adapted from Kogan, 2011, p. 58).

According to the sound correspondences Kogan (2011) provides and other reconstructions, it can be said that the Proto-Semitic pharyngeal fricative */ʕ/ changed into a glottal stop /ʔ/ in Mehri. Similarly, when the same word ‘a bone’ was elicited in Harsusi, it was given with a glottal stop as in /ʔaɬˤiːɬˤ/ - [ʔa.ˈɮˤajːɬˤ] ‘a bone F.SG’. Thus, it can be said here that the voiced pharyngeal fricative /ʕ/ has been substituted by the glottal stop /ʔ/ in Harsusi.

The substitution of the voiced pharyngeal fricative /ʕ/ by the glottal stop /ʔ/ and the influence of Arabic were checked in three ways. First, Arabic loan words such as:

/ˈʕi:d/ ‘Eid M.SG’ and /ʃeˈʕi:r/ ‘barley M.SG’ were produced by replacing the voiced pharyngeal fricative /ʕ/ by a glottal stop /ʔ/ and consultants were asked for their judgements. All of the consultants stated that the tokens with the voiced pharyngeal fricative /ʕ/ were the correct forms. This proved that these words were the result of Arabic influence since the voiced pharyngeal fricative /ʕ/ in Harsusi changed into a glottal stop /ʔ/ as was seen in the other examples. Then, the words which were attested in the data with both the voiced pharyngeal fricative /ʕ/ and the glottal stop /ʔ/ such as: /sˤaːˈʔeːt/ - [sˤa̤ːˈʕajt̪] or [sˤa̤ːˈʔajt̪] ‘nine F.SG’, were produced twice. They were produced once with a voiced pharyngeal fricative /ʕ/ and once with a glottal stop /ʔ/. Then, the consultants were asked for their judgements. All the consultants agreed that all tokens, those with a voiced pharyngeal fricative /ʕ/ and those with a glottal stop /ʔ/, were correct and acceptable. However, two consultants pointed out that the most correct forms were those with a glottal stop. Finally, certain words which are etymologically of the same origin and found in both Arabic and Harsusi such as the words for ‘root’ and ‘eye’ were tested. In Arabic they are found with a voiced pharyngeal fricative /ʕ/. Nonetheless, in Harsusi the voiced pharyngeal fricative /ʕ/ is substituted by the glottal stop /ʔ/ as can be seen in table 2. 25 below.

Word	**Language**	
	Harsusi	**Arabic**
Root	/ˈʔark’/	/ˈʕaraq/
Eye	/ˈʔajn/	/ˈʕajn/

Table 2. 25: Glottal stop /ʔ/ and pharyngeal fricative /ʕ/ in Harsusi and Arabic

When these words were produced with a voiced pharyngeal fricative /ʕ/, all the consultants judged them as Arabic words and insisted using the glottal stop /ʔ/ to sound

more Harsusi. Thus, all the previous data prove that the voiced pharyngeal fricative /ʕ/ is replaced by a glottal stop /ʔ/ in Harsusi words and the occurrence of the voiced pharyngeal fricative /ʕ/ in some examples can be a result of Arabic language influence especially in the speech of the younger generation.

In utterance final or pausal positions, the voiced pharyngeal fricative /ʕ/ is not attested in the data. For instance, by looking at the roots of the words and etymological evidence, the pharyngeal is expected to occur in words like 'finger M.SG' which has the reconstructed root * t͡sʼ-b-ʕ. Nonetheless, the pharyngeal fricative /ʕ/ is not found in the Harsusi word /ħaʃˤa:ba/ which is expected to be */ħaʃˤa:baʕ/. This is probably due to the fact that the glottal stop /ʔ/ in Harsusi gets dropped in utterance final or pausal positions and is rarely realized by the speakers as will be seen below.

The glottal stop /ʔ/ in Harsusi occurs mainly in word initial positions as was seen under (Plosives). It was not attested in word medial or utterance final positions in the data except in one word which is /sˤa:ˈʔe:t/ - [sˤa̤:.ˈʕajt̪] or [sˤa̤:.ˈʔajt̪] 'nine F.SG' where it is replacing the voiced pharyngeal fricative /ʕ/. Indeed, the data show that the glottal stop /ʔ/, whether etymologically is a glottal stop /ʔ/ or replacing the voiced pharyngeal fricative /ʕ/, is dropped in Harsusi in word medial and utterance final or pausal positions. As was seen under (Plosives), word medially the glottal stop /ʔ/ is dropped in the word /ˈju:mer/ - [ˈjaw.mər] 'say 3M.SG.IPFV' instead of */ˈju:ʔmer/ compared to /ʔa:ˈmu:r/ - [ʔa:.ˈmu:r] 'said 3M.SG.PFV'. Similarly, in pausal positions, the glottal stop /ʔ/ is dropped in the word /beˈda:/ - [bəˈd̪a] 'started 3M.SG.PFV' instead of */beˈda:ʔ/ compared to the standard Arabic word /ˈbadaʔa/ - [ˈbad̪aʔa] 'started 3M.SG.PFV'.

The table below shows more examples of the glottal stop /ʔ/ in word initial positions.

Phoneme	Initial
/ʔ/	/ʔaˈto:m/ - [ʔa.ˈt̪o:m] ‘you 2M.PL’ /ʔaˈte:n/ - [ʔa.ˈt̪e:n] ‘you 2F.PL’ /ʔaˈfar/ - [ʔa.ˈfːar] ‘red M.SG’ /ʔermi:d/ - [ʔər.ˈmi:t̪] ‘ash M.SG’

Table 2. 26: Glottal stop /ʔ/ in initial position

The glottal stop also occurs at initial positions of imperative and first-person imperfective verbs when elicited in isolation as can be seen in the examples in table 2. 27 below.

Imperatives	Imperfective 1CS
/ʔesˈke:b/ - [ʔəsˈke:p] ‘pour 2M.SG.IMP’	/ʔasˈko:b/ - [ʔas.'ko:p] ‘pour 1C.SG.IPFV’
/ʔenˈθo:k/ - [ʔən.ˈθo:k] ‘bite 2M.SG.IMP’	/ʔanˈθo:k/ - [ʔan.ˈθo:k] ‘bite 1C.SG.IPFV’
/ʔenˈfax/ - [ʔən.ˈfax] ‘blow 2M.SG.IMP’	/ʔanˈfax/ - [ʔan.ˈfax] ‘blow 1C.SG.IPFV’
/ʔeħˈfe:r/ - [ʔəħ.'fe:r] ‘dig 2M.SG.IMP’	/ʔaħˈfe:r/ - [ʔaħ.'fe:r] ‘dig 1C.SG.IPFV’
/ʔeˈze:m/ - [ʔə.'ze:m] ‘give 2M.SG.IMP’	/ʔaˈze:m/ - [ʔa.'ze:m] ‘give 1C.SG.IPFV’
/ʔelˈbe:d/ - [ʔəl.ˈbe:t̪] ‘hit 2M.SG.IMP’	/ʔalˈbe:d/ - [ʔal.ˈbe:t̪] ‘hit 1C.SG.IPFV’
/ʔaˈɬaɬ/ - [ʔa.ˈɬaɬ] ‘stand 2M.SG.IMP’	/ʔaˈɬaɬ/ - [ʔa.ˈɬaɬ] ‘stand 1C.SG.IPFV’
/ʔer.ˈħa:ɬ/ - [ʔer.ħa:ɬ] ‘wash 2M.SG.IMP’	/ʔar.ˈħa:ɬ/ - [ʔar.ħa:ɬ] ‘wash 1C.SG.IPFV’

Table 2. 27: Glottal Stop Phoneme /ʔ/ in Imperatives and Imperfectives

To conclude, it can be said that the glottal stop /ʔ/ has replaced the voiced pharyngeal fricative /ʕ/ in Harsusi and the attestation of the voiced pharyngeal fricative /ʕ/ in the speech of the younger generation is probably due to Arabic language influence since they all grow up learning Arabic both at home and school. The glottal stop /ʔ/ occurs mainly in word initial positions and is dropped word medially and at utterance final positions. Therefore, and for the sake of simplification, the symbols /ʔ/ and /ʕ/ for the glottal stop phoneme and voiced pharyngeal fricative phoneme, respectively, are used as they occur in the data. This means that the symbol /ʔ/ for the glottal stop is used even

in cases where the glottal stop /ʔ/ is replacing a historical voiced pharyngeal fricative /ʕ/ as in /ˈʔajn/ ‘eye F.SG’ compared to Arabic /ˈʕajn/ ‘eye F.SG’.

THE VOWEL PHONEMES

This section will deal with the vowel phonemes and their allophones in Harsusi. Harsusi has 7 vowels in total, 2 short and 5 long vowels. The short vowels are /e/ and /a/ while the long vowels are /a:/, /e:/, /i:/, /o:/ and /u:/. These long vowels get shortened in utterance final or pausal positions. In addition, when the vowels are preceded by an ‘Emphatic’ sound in Harsusi, their qualities change to become more closed and back as a result of ‘Emphatic’ sounds effect on vowel formants. As was mentioned earlier under (The Phonetic Realization of ‘Emphatics’), the ‘Emphatic’ sounds’ effect on surrounding vowel formants was found in other languages as well (see Bin-Muqbil 2006; Jongman et al. 2011; Yeou 1997; Zawaydeh 1999). Similar to the other studies, the effect of ‘Emphatics’ in Harsusi was found on surrounding vowel formants and especially the vowels following an ‘Emphatic’ sound. In the presence of an ‘Emphatic sound, as was mentioned earlier under (The Phonetic Realization of ‘Emphatics’), the F1 of the following vowel was higher and the F2 was lower compared to other environments lacking the presence of an ‘Emphatic’ sound. The vowel chart below shows all the distinct vowels of Harsusi plotted in neutral positions to avoid the effect of emphatics on vowel formants.

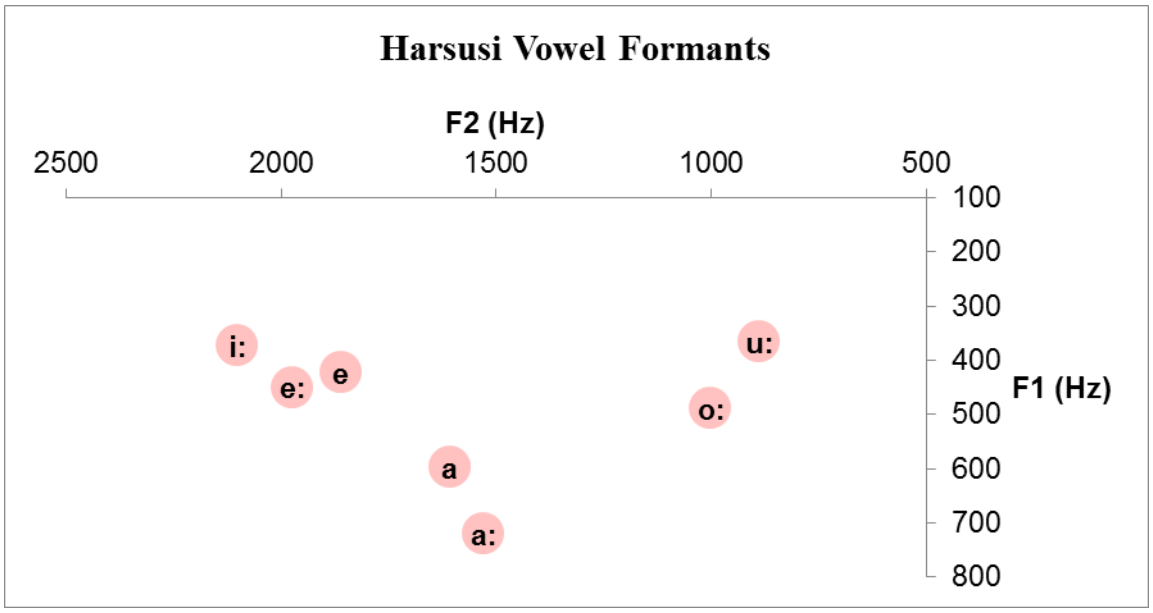

Figure 2. 28: Harsusi vowel chart

Short Vowels

Phonemically, only two short vowels were found in Harsusi which are /a/ and /e/. Both vowels are realized differently in different environments as will be discussed below.

Other short vowels are found only in utterance final or pausal positions; therefore, they can be considered as allophones of the long vowels which result from the shortening of long vowels in final positions (See section 2.2.2 below).

The /a/ vowel can occur in both stressed and non-stressed, and open and closed syllables. It has two allophones which are [a] and a more backed or retracted [ạ]. The examples below show the /a/ vowel in different environments.

Environment	Example
Closed/Stressed	/ˈðakmeh/ - [ˈðak.məh] ‘that M.SG.DEM’
Open/Stressed	/ˈʔafer/ - [ˈʔa.fər] ‘red M.PL’
Closed/Not Stressed	/ʔarˈboːt/ - [ʔar.ˈboːt] ‘four F.PL’
Open/Not Stressed	/haˈʃiːʃ/ - [ḥa.ˈʃiːʃ] ‘grass M.PL’
After Emphatic	/ˈðˤarb/ - [ˈðˤa̱rb] ‘twig/firewood M.SG’

Table 2. 28: Environments of /a/ vowel

The distribution of the different allophones of the short vowel /a/ can be stated in the phonological rule below.

Rule 18:

/a/ ⟶ [a̱] / /C/ [+emphatic] __ , and [a] / elsewhere

The previous rule indicates that the [a̱] allophone occurs after ‘Emphatic’ and pharyngeal sounds such as /ħ/ and /ʕ/ as it has a more closed and back quality, while the [a] allophone occurs elsewhere.

Rule 18 can be made a general rule which can be called ‘Vowel Retracting and lowering’ rule which can work in case of all vowels that occur after ‘Emphatics’ or pharyngeals in Harsusi. It can be formally stated as below in Rule 19.

Rule 19 ‘Vowel Retracting and Lowering’:

/V/ ⟶ /V/[+back , +low] / /C/ [+emphatic] __

The previous rule indicates that any vowel occurring after ‘Emphatic’ or pharyngeal consonants will be realized with a more back and lower quality compared to

other environments. It is worth mentioning here that this affects all the vowels in Harsusi regardless of their qualities.

The vowel /e/ can also occur in in both stressed and non-stressed, and open and closed syllables. However, the /e/ vowel has different allophones in each environment. In non-stressed syllables, the /e/ vowel is realized as a schwa [ə]. In stressed syllables, it is realized as a more front and higher variant [e] in closed syllables and as a more back and lower [ʌ] in open syllables. The examples below in table 2. 29 show the /e/ vowel in different environments.

Environment	**Example**
Closed/Stressed	/ˈʃekf/ - [ˈʃekf] ‘sleep 2M.SG.IMP’ /meˈlest/ - [məˈlesʈ] ‘smooth M.SG’
Open/Stressed	/leben/ - [ˈlʌ.bən] ‘those M.PL.DEM’
Closed/Not Stressed	/ferˈfeːr/ - [fərˈfeːr] ‘feather F.SG’ /kerˈmeːm/ - [kərˈmeːm] ‘mountain M.SG’
Open/Not Stressed	/θeˈroːh/ - [θəˈroːh] ‘two M.PL’ /ʁeˈgeːn/ - [ʁəˈgeːn] ‘boy M.SG’

Table 2. 29: Environments of /e/ vowel

Johnstone (1977) noted that the vowel /e/ is realized as [u] when followed by /w/ and [i] when followed by /j/; however, no examples were given. The data show that /e/ is realized as [u] and [i] when either preceded or followed by /w/ and /j/, respectively. There were several examples in the data where a short [u] and a short [i] can be seen either preceding or following /w/ and /j/, respectively. The table below shows some of these examples.

Environment	Example
Preceded by /w/	/weˈreːk'/ - [wu.ˈreːk'] 'leaves F.PL' /ˈwerex/ - [ˈwu.rəx] 'months F,PL'
Followed by /w/	/ˈtewi/ - [ˈt̪u.wi] 'meat M.SG' /sˤeˈwar/ - [sˤu̯.ˈwar] 'stone F.SG'
Preceded by /j/	/jeˈtiːt/ - [ji.ˈt̪iːt̪] 'six F.PL' /jeˈdiːn/ - [ji.ˈdiːn] 'new M.SG'
Followed by /j/	/reˈjaħ/ - [ri.ˈjaħ] 'wind F.SG' /seˈjuːr/ - [si.ˈjuːr] 'went 3M.SG.PFV'

Table 2. 30: Vowel /e/ as [u] and [i]

As can be seen in table 2. 30, the occurrence of the allophones [u] and [i] in Harsusi is conditioned with the presence of either one of the glides /w/ or /j/. Therefore, it can be concluded that both of the allophones [u] and [i] are allophones of the vowel /e/ that assimilates into the features of the preceding or following glide. The phonological distribution of the allophones [u] and [i] can be stated formally in Rules 20 and 21 below, respectively.

Rule 20:

/e/ → [+back , +round , +high] / { /C/ [-consonant , +syllabic , +round , +back , +high] __ ; __ /C/ [-consonant , +syllabic , +round , +back , +high] }

Rule 21:

/e/ → [-back , -round , +high / { /C/ [-consonant , +syllabic , -round , -back , +high] __ ; __ /C/ [-consonant , +syllabic , -round , -back , +high] }

The previous two rules indicate that the short vowel /e/ assimilates to the features of the either preceding or following glide phoneme in Harsusi. As can be seen, it

assimilates in the features of backness, roundness and height to either the preceding or following glide phoneme.

Long Vowels

The longs vowels in Harsusi are five in total, two back rounded vowels /u:/ and /o:/, two front unrounded vowels /i:/ and /e:/ and one central unrounded vowel /a:/. The table below shows these different vowels in different Harsusi words. As can be seen in the table below, not all the long vowels are attested in utterance final positions. Only the vowels /a:/, /i:/ and /u:/ has been attested in final positions. In addition, it should be noted here that all vowels in Harsusi, including these long vowels, get affected when they occur following an 'Emphatic' or pharyngeal sound as was shown in Rule 17 'Vowel Retracting and Lowering' above. As was mentioned earlier, the 'Emphatic' sounds affect the vowel formants by raising the F1 and lowering the F2 which results in lower and more back vowels. Thus, in case of the long vowels, the presence of an 'Emphatic' or pharyngeal sound results in a more centralized variant of the vowel.

Phoneme	Medial	Utterance Final	After Emphatic
/a:/	/ˈnɬa:f/ - [ˈn̪ɬa:f] ‘mattresses F.PL’ /ra:ˈɬi:t/ - [ra:.ˈɬi:t̪ʰ] ‘snake M.SG’	/nˈħa:/ - [n̪ˈħa̪] ‘we 1C.PL.INCL’ /ˈho:ba:/ - [ˈho:ba̪] ‘seven F.PL’	/kʾeʃˤa:b/ - [kʾəˈ.ʃˤa̪:p] ‘cut 3M.SG.IMP’ /ˈħa:m/ - [ˈħa̪:m] ‘mother F.SG’
/e:/	/ˈse:n/ - [ˈse:n] ‘they 3F.PL’ /ʔałeˈre:t/ - [ʔa.ɬəˈre:t̪ʰ] ‘ten F.PL’ /weˈre:kʾ/ - [wu.ˈre:kʾ] ‘leaves F.PL’		
/i:/	/ˈhi:t/ - [ˈhi:t̪ʰ] ‘you 2C.SG’ /θiːˈdi/ - [θi:.ˈdi] ‘breasts F.PL’	/jeˈtu:ki:/ - [jəˈ.t̪u:.ki] ‘drinks 3M.SG.IMPV’	/θeˈkʾi:l/ - [θeˈ.kˤi̪:l] ‘heavy M.SG’ /kʾeˈtˤi:n/ - [kʾəˈ.t̪ˤi̪:n] ‘slim M.SG’
/o:/	/ʔeˈto:m/ - [ʔəˈ.t̪o:m] ‘you 2M.PL’ /ˈʁo:θi:/ - [ˈʁo:.θi] ‘neck F.SG-1POSS’ /ˈho:ba/ - [ˈho:ba̪] ‘seven F.PL’		/jeˈtˤo:n/ - [jiˈ.tˤo̪:n] ‘stab 3M.SG.IMPV’ /heˈɬˤo:r/ - [həˈ.ɮˤo̪:r] ‘green M.SG’
/u:/	/ˈbu:meh/ - [ˈbu:.məh] ‘here DEM.LOC’ /keˈlu:b/ - [kəˈ.lu:pʰ] ‘dogs F.PL’ /kʾeˈru:n] - [kʾəˈ.ru:n] ‘horns F.PL’	/teˈħa:rbu:/ - [t̪əˈ.ħa̪:r.bu] ‘fought 3M.PL.PFV’	/kʾeˈʃˤu:b/ - [kʾəˈ.ʃˤu̪:p] ‘searches 3M.SG.IPFV’

Table 2. 31: Harsusi long vowels

__/a:/ and /e:/ Vowels__

The data reveals that the vowels /a:/ and /e:/ are separate phonemes in Harsusi as can be seen in the minimal pair in table 2. 32 below.

Phoneme	Example
/a:/	/ˈnɬa:f/ - [ˈn̪ɬa:f] ‘matresses F.PL’
/e:/	/ˈnɬe:f/ - [ˈn̪ɬe:f] ‘mattress F.SG’

Table 2. 32: /a:/ and /e:/ minimal pairs

It was suggested by Johnstone (1977) that /a:/ is an allophone of /e:/ that occurs after guttural sounds, which are post-velar sounds. In addition, Johnstone stated that after 'glottalic' sounds, the group of 'Emphatic' sounds that has a secondary place of articulation at the back of the oral cavity, either [ạ:] or [aj] occur as allophones of /e:/. Indeed, some of the singular feminine nouns do show [ạ:] occurring after 'Emphatic' and pharyngeal sounds and [e:] in other positions in the singular feminine endings as can be seen in the examples in table 2. 33 below.

Phoneme	**Positions**	
/e:/	**After 'Emphatics' and pharyngeals**	**Elsewhere**
	/werˈk'e:t/ - [wər.ˈkˤạ:t̪ʰ] 'leaf F.SG' /ħelˈk'e:t/ - [ħəɬ.ˈkˤạ:t̪ʰ] 'circle F.SG' /melˈħe:t/ - [məl.ˈħạ:t̪ʰ] 'salt F.SG'	ħaˈbe:t/ - [ħa.ˈbe:t̪ʰ] 'seed F.SG' /kelˈfe:t/ - [kəl.ˈfe:t̪ʰ] 'date palm bark F.SG' /bek'eˈle:t/ - [bə.kˤə.ˈle:t̪ʰ] 'egg F.SG'

Table 2. 33: Vowel /e:/ different allophones

However, as for [aj] as an allophone for /e:/, it was not attested in the data, but this can be due to the difficulty in distinguishing between /e:/ and /i:/ in certain cases as will be shown below under (/e:/ and /i:/ Vowels). Moreover, it can also be inferred that in certain cases after post-velar sounds such as /χ/ and /ʁ/, a third allophone [a:] might occur; however, this has not been attested in the data.

From the previous examples it is clear that both /e:/ and /a:/ are separate phonemes in Harsusi, but after the 'Emphatic' sounds, which include /tˤ/, /k'/, /ðˤ/, /sˤ/, /ʃˤ/ and /ɬˤ/, pharyngeals such as /ʕ/ and /ħ/ and post-velars such as /χ/ and /ʁ/, there is a neutralization. The distribution of the different allophones of the long vowels /a:/ and /e:/ can be stated formally in the phonological rules below.

Rule 22:

/a:/ → [ạ:] / /C/ [+emphatic] __ , [a] / __# , and [a:] / elsewhere

Rule 22 of the allophones of the long vowel /a:/ indicates that the allophone [ạ:] occurs after 'Emphatics' and pharyngeals, the allophone [a] occurs at utterance final positions, while the allophone [a:] occurs elsewhere.

Rule 23:

/e:/ → [ạ:] / /C/ [+emphatic] __ , and [e:] / elsewhere

Rule 23 of the allophones of the long vowel /e:/ indicates that the allophone [ạ:] occurs after 'Emphatics' and pharyngeals, while the allophone [e:] occurs elsewhere. The vowel /e:/ has not been attested at utterance final positions in the data.

With regard to the phonetic realization of both of the vowels /a:/ and /e:/ after 'Emphatics' and pharyngeals, they are realized as more centralized vowels and their qualities are more open and back as was shown in Rule 19 above.

/e:/ and /i:/ Vowels

Exact minimal pairs were not found for /e:/ and /i: / in the data; however, there are some near minimal pairs which suggest that they are both separate phonemes in Harsusi. The examples below in table 2. 34 show both vowels occurring in a near minimal pair.

Phoneme	Example
/e:/	/fer.ˈfeːr/ - [fər.ˈfeːr] ‘feather F.SG’
/i:/	/ðˤe.ˈfiːr/ - [ðˤə.ˈfiːr] ‘fingernail F.SG’

Table 2. 34: /e:/ and /i:/ near minimal pair

The distinction between /e:/ and /i:/ is rather complicated as their qualities overlap in certain positions. Johnstone (1977) stated that after guttural, which are the post-velar sounds and glottalized consonants, the open qualities of phoneme /i:/ overlap with the closer qualities of phoneme /e:/. Indeed, articulatory analysis of the data as discussed under (The Phonetic Realization of ‘Emphatics’) shows that after the ‘Emphatics’ and the pharyngeals, the F2 formant of the phoneme /i:/ gets lowered and the F1 formant gets higher which results in a more centralized vowel closer in qualities to /e:/ as in /k’e.ˈtˤiːn/ - [k’ə.ˈt̪ˤi̞ːn] ‘slim M.SG’.

The long high vowel /i:/ gets diphthongised when it is in a stressed syllable and preceded by an ‘Empathic’, in some cases, or post-velar sounds, which include pharyngeals and uvualrs, into a [aj]. This fact is clearly seen in the verb paradigm of the masculine singular perfective as the examples show in table 2. 35 below.

Phoneme	Positions	
/i:/	**After ‘Emphatics’, pharyngeals and uvulars**	**Elsewhere**
	/ˈħiːber/ - [ˈħaj.bər] ‘felt cold 3M.SG.PFV’ /ˈħiː.rek’/ - [ˈħaj.rək’] ‘stole 3M.SG.PFV’ /ˈʁiːrek’/ - [ˈʁajrek’] ‘drowned 3M.SG.PFV’ /k’e.ˈtˤiːn/ - [k’ə.ˈt̪ˤi̞ːn] or [k’ə.ˈt̪ˤajn] ‘slim M.SG’	/ˈθiːber/ - [ˈθiːbər] ‘broke 3M.SG.PFV’ /ˈliː.bes/ - [ˈliː.bəs] ‘dressed 3M.SG.PFV’

Table 2. 35: Diphthongisation of /i:/

It should be noted here that the diphthongisation process is not regular. As was mentioned earlier, after ‘Emphatics’, a more centralised allophone [i̞ː] occurs which can

be seen in the example /k’e.ˈtˤi:n/ - [k’ə.ˈt̪ˤi̪:n] or [k’ə.ˈt̪ˤajn] ‘slim M.SG’ in table 2.35 above; however, another example was found where the consultant diphthongized the vowel /i:/ after an emphatic as can be seen in the word for ‘fat’ in table 2. 36 below.

Phoneme	**Example**
/i:/	/ˈsˤi:leħ/ - [ˈsˤaj.ləħ] ‘fat/chubby M.SG’

Table 2. 36: /i:/ diphthongisation after 'Emphatic'

The diphthongisation in the previous example can be proven by looking at the consonantal root of the word. The root of the word for ‘fat’ is /sˤ-l-ħ/ and includes no glide. Therefore, it can be said that the [aj] in this example is a diphthongisation of /i:/ which is phonologically conditioned rather than a distinct diphthong. By looking at the environments where the vowel /i:/ gets diphthongised, we can see the sounds preceding the long vowel /i:/ have certain phonological features in common as the pharyngeal and the post-velar sounds are +consonant, +continuant and – coronal and the ‘Emphatics’ are either +pharyngeal or +laryngeal. The following observations can be made about the realizations of the vowel /i:/:

[i̪:] or [aj]: when the vowel is preceded by a consonant that is [+emphatic].

[aj] when the vowel is preceded by a consonant that is [+consonant, +continuant, -coronal].

[i:] when the vowel is preceded by any other consonant.

[i] when the vowel occurs in final position.

Since the allophone [i:] has a wider distribution, it can be taken as the underlying representation /i:/ and the allophones can be derived as follows:

	UR	/ˈliː.bes/	/ˈħiːber/	/kʼe.ˈtˤiːn/	/ˈθariː/
-	‘Vowel Reduction’	-	-	-	i
-	‘Vowel Retraction’	-	-	ịː	
-	‘Diphthongisation’	-	aj		
	PR	[ˈliː.bəs]	[ˈħaj.bər	[kʼə.ˈt̪ˤịːn]	[ˈθa.ri]

Therefore, it can be concluded here that the high long vowel /iː/ has four allophones which are a short [i], a more open and back [ịː], a diphthong [aj] and a high closed [iː]. The short [i] occurs at utterance final positions, the open and back [ịː] occurs after ‘Emphatics’, the diphthong [aj] occurs after post-velar sounds, which are pharyngeals and uvulars, and in certain cases after ‘Emphatics’ and the [iː] occurs elsewhere.

The distribution of the different allophones of the long vowels /iː/ can be stated formally in the phonological rule 24 below.

Rule 24:

/iː/ → [i] / __#

[ịː] / /C/ [+emphatic] __

[aj] / /C/ [class of post-velars and ‘Emphatics’] __

, and [eː] / elsewhere

Moreover, another example of diphthongisation was also found where the glide /j/ is not part of the consonantal root and the vowel /iː/ is not preceded by an ‘Emphatic’ or post-velar sound. For example, the word for ‘white’ was given as /ʔa.lebeniːt/ - [ʔa.lə.bəˑnajt̪ʰ] ‘white F.SG’, while its consonantal root is /l-b-n/. This example suggests

that the diphthongisation process in Harsusi is not regular or the speakers are probably overgeneralizing it in other contexts as well. From the examples it can be inferred that the condition for diphthongisation is to be preceded by a post-velar or 'Emphatic' sound given the high number of examples; nonetheless, some younger speakers seem to be overgeneralizing the rule in other contexts as well with less regularity.

Johnstone (1977) states that this diphthongisation process seems to affect the /e:/ vowel as well since /e:/ and /i:/ qualities overlap, and consultants use their qualities indifferently in phonetic contexts. Nonetheless, there were no examples in the data where a phonemic /e:/ undergoes the diphthongisation process. This might be due to the fact that the /e:/ vowel has an allophone [ạ:] that occurs after 'Emphatics' and pharyngeals; thus, reducing the number of environments for diphthongisation as was seen above under (/a:/ and /e:/ Vowels).

/o:/ and /u:/ Vowels

Similar to the previous two long vowels, only some near minimal pairs have been found in the data for the vowels /o:/ and /u:/ which are given below.

Phoneme	**Example**
/o:/	/ʔarˈbo:t/ - [ʔar.ˈbo:t̪ʰ] 'four F.PL' /kerˈmo:m/ - [kər.ˈmo:m] 'mountains M.PL' /jeˈdo:nten/ - [ji.ˈdo:n.t̪ən] 'new M.SG'
/u:/	/ʔaːˈmuːr/ - [ʔaː.ˈmuːr] 'said 3M.SG.PFV' /kenˈmu:t/ - [kən.ˈmu:t̪ʰ] 'louse F.SG' /ħaːˈduːten/ - [ħaː.ˈduː.t̪ən] 'hands F.PL'

Table 2. 37: /o:/ and /u:/ near minimal pairs

According to Johnstone (1977), similar to /e:/ and /i:/, the qualities of /o:/ and /u:/ also overlap in certain phonetic environments and distinguishing them becomes hard. However, the data show that the vowel /o:/ can occur after post-velar and 'Emphatic' sounds more regularly than the vowel /u:/ which undergoes diphthongisation and [aw] occurs instead when preceded by a pharyngeal or post-velar sound similar to /i:/ vowel as seen above in (2.2.2.2). Below are the examples showing both /o:/ and /u:/ after the pharyngeal /ħ/, post-velar /ʁ/ and 'Emphatics'.

Phoneme	**Example**
/o:/	/jeˈtˤo:n/ - [ji.ˈt̪ˤo̞:n] 'stabs 3M.SG.IPFV' /ˈsˤo:r/ - [ˈsˤo̞:r] 'stood up/stopped 3M.SG.PFV' /ˈxo:tˤer/ - [ˈxo̞:.t̪ˤər] 'below LOC'
/u:/	/k'eˈʃˤu:b/ - [k'ə.ˈʃˤu̟:p] 'searches 3M.SG.IPFV' /jeˈħu:fer/ - [ji.ˈħaw.fər] 'digs 3M.SG.IPFV' /jeˈʁu:.bər/ - [ji.ˈʁaw.bər] 'meets 3M.SG.IPFV' /ˈju:mer/ - [ˈjaw.mər] or [ˈju:.mər] 'says 3M.SG.IPFV'

Table 2. 38: /o:/ and /u:/ after 'Emphatics', pharyngeal and post-velars

The previous examples show that the vowel /u:/ undergoes diphthongisation when we compare the verbs /jeˈʁu:.bər/ - [ji.ˈʁaw.bər] 'meets 3M.SG.IPFV' to /jeˈlu:bed/ - [je.ˈlu:bə̪t̪] 'hits 3M.SG.PFV'. Both of the previous verbs are supposed to be following the same paradigm of imperfective verbs for third person masculine singular and none of them includes a glide /w/ in its consonantal root. Thus, it can be said that the vowel /u:/ in the previous examples is diphthongized into [aw] when it is preceded by the post-velars /ʁ/ and /χ/ or pharyngeals /ħ/ and /ʕ/. Nonetheless, in the case of /k'eˈʃˤu:b/ - [k'ə.ˈʃˤu̟:p] 'searches 3M.SG.IPFV', regardless of the presence of an 'Emphatic' sound which is /ʃˤ/, the /u:/ does not get diphthongized and a more centralized variant [u̟:] occurs. In addition, in the verb /ˈju:mer/ 'says 3M.SG.IPFV' which has the consonantal root

of /ʕ-m-r/, it can be seen that /u:/ is realized both as a diphthong [aw] and a high back rounded vowel [u:]. Therefore, it seems that similar to the front high long vowel /i:/, the back high rounded long vowel /u:/ gets diphthongized in the presence of post-velars and precisely the phonemes /ʁ/, /χ/, /ħ/, /ʕ/ and /j/ as seen in the examples. In the presence of 'Emphatic' sounds, the back high rounded long vowel /u:/ becomes a more open and back vowel and the variant [ụ:] occurs. In all other environments, the allophone [u:] occurs.

It should be noted that regardless of this diphthongisation being quite regular in case of /u:/, examples have also been found where /o:/ has undergone the same process in different phonetic environments. Therefore, it can be stated that this might be an idiosyncratic over-generalization in these examples provided by those speakers. Examples are given below in table 2. 39.

Phoneme	**Examples**	
/o:/	**Diphthongisation**	**No diphthongisation**
	/ˈho:ma/ - [ˈhaw.ma] or [ˈho.ma] 'heard 3M.SG.PFV' /ˈmo:na/ - ['maw.na] or ['mo:.na] 'grabbed 3M.SG.PFV'	/jeˈho:ma/ - [ji.ˈho:.ma:] 'hears 3M.SG.IPFV' /jeˈmo:na/ - [ji.ˈmo:na:] 'grabs 3M.SG.IPFV'

Table 2. 39: Examples of vowel /o:/

Both of the verbs /ˈho:ma/ 'heard 3M.SG.PFV' and /ˈmo:na/ 'grabbed 3M.SG.PFV' has no glide /w/ in their consonantal roots which are /h-m-ʔ/ and /m-n-ʔ/ and can be reconstructed to */s-m-ʕ/ and */m-n-ʕ/. Moreover, they were also given by some consultants with no diphthongisation. Nonetheless, what is interesting is that the diphthongisation occurs in these examples only when the vowel [o:] is in an initial

stressed syllable and no other stressed syllables as in ˈhoːma/ - [ˈhaw.ma] or [ˈho.ma] ‘heard 3M.SG.PFV’ and not in /jeˈhoːma/ - [ji.ˈhoː.maː] ‘hears 3M.SG.IPFV’.

Therefore, it can be concluded here that the high back rounded long vowel /u:/ has four allophones which are a short allophone [u], a more open and back [ụ:], a diphthong [aw] and a high closed [u:]. The short allophone [u] occurs at utterance final positions, the open and back [ụ:] occurs after ‘Emphatics’ and pharyngeals, the diphthong occurs after post-velar sounds and the [u:] occurs elsewhere. As for the vowel /o:/, it has three allophones which are a more open and back [ọ:] that occurs after the ‘Emphatics’ and pharyngeals, a diphthong [aw] in initial stressed syllables and [o:] which occurs elsewhere. However, the diphthongisation can be just an over-generalization of the diphthongisation process by those speakers since the conditioning environment of having a post-velar or ‘Emphatic’ sound, which was found in most of the other examples in the data, is not found in these cases of /o:/ diphthongisation.

The distribution of the different allophones of the long vowels /u:/ and /o:/ can be stated formally in the phonological rules 25 and 26 below.

Rule 25:

/u:/ → [u] / __#

[ụ:] / /C/ [+emphatic] __

[aw] / /C/ [class of post-velars] __

, and [u:] / elsewhere

Rule 26:

/o:/ → [o̤:] / /C/ [+emphatic] __

[aw] / [in initial stressed syllable]

, and [o:] / elsewhere

Diphthongs and Diphthongisation

In terms of the diphthongs, Johnstone (1977) mentioned that there are eight different diphthongs which include aw, aj, ew, ej, e:w, i:w, o:j and u:j (Adapted from Johnstone, 1977, p. xiii). However, no minimal pairs were found in the data to prove the diphthongs as separate phonemes. The glides /w/ and /j/ were found following different vowels suggesting diphthongs; however, by looking at the consonantal roots of the words, it can be seen that they are not real phonemic diphthongs, but vowel+glide clusters. Table 2. 40 below shows examples of the words showing these different clusters found in the data.

Consonantal root	**Vowel+Glide Clusters**
/ʔ-j-n/	/ˈʔajn/ - [ˈʔajn] ‘eye F.SG’
/ħ-j-r/	/ˈħajr/ - [ˈħajr] ‘donkey M.SG’
/k’-j-d/	/ˈk’ajd/ - [ˈk’ajt̪] ‘donkey M.SG’
/x-j-m/	/ˈxajmeh/ - [ˈxaj.məh] ‘dirt F.SG’
/ħ-w-r/	/ħew.ˈro:t/ - [ħuw.ˈro:t̪ʰ] ‘black F.SG’
/k’-n-w/	/mek’ene:w/ - [ma.kˤə.ˈne:w] ‘child M.SG’

Table 2. 40: Examples of Vowel+Glide clusters

As noted above in (2.2.2.2 and 2.2.2.3), the diphthongs [aj] and [aw] occur in some examples as allophones of the long vowels /i:/ and /u:/ and less regularly /e:/ and

/oː/ when they are followed by post-velar sounds such as: the uvulars /χ/ and /ʁ/, pharyngeals /ħ/ and /ʕ/ and the 'Emphatics' in some cases.

THE SYLLABLE STRUCTURE

The syllable structure in Harsusi is very rich. Different types of syllables were attested in the data. Harsusi can have light open syllables V and CV and heavy open and closed syllables as CVV and CVC. In addition, it can also have super-heavy closed syllables as CVVC and CVCC. There were also few instances of a heavier syllable as CCVVC, but this needs further investigation as some speakers do insert sometimes a [ə] sound in the initial consonant cluster. The table below shows these syllables in Harsusi words.

Syllable Type	**Structure**	**Example**
Open light	V	/nxeˈriːr/ - [n̥.xəˈriːr] ‘nose F.SG’ /nxeˈroːr/ - [n̥.xəˈroːr] ‘noses F.PL’ /ɬteˈreːr/ - [ɬ̥.t̪əˈreːr] ‘pond F.SG’
	CV	/keˈluːb/ - [kəˈluː p] ‘dogs F.PL’ /ɬeˈweːt/ - [ɬuˈweːt̪ʰ] ‘fire F.PL’ /beħeˈlaj/ - [bəˈħəˈlːaj] ‘tonight’
Heavy open	CVV	/ˈxoːtˤer/ - [ˈxoːt̪ˤər] ‘below LOC’ /ˈθoːdi/ - [ˈθoːdi] ‘breast M.SG’ /ħaːˈduːten/ - [ħaːˈduːt̪ən] ‘hands F.PL’
Heavy Closed	CVC	/ˈheh/ - [ˈhʌh] ‘he 3M.SG’ /ˈseh/ - [ˈsʌh] ‘she 3F.SG’ /ˈðem.neh/ - [ˈðem.nəh] ‘this F.DEM’
Super heavy closed	CVVC	/ˈhiːt/ - [ˈhiːt̪ʰ] ‘you 2M.SG’ /ˈhoːm/ - [ˈhoːm] ‘they 3M.PL’ /ˈɬexliːθ/ - [ˈɬʌx.liːθ] ‘third M.SG’
	CVCC	/ˈħark’/ - [ˈħark’] ‘hot M.SG’ /ˈʃekf/ - [ˈʃekf] ‘sleep 2M.SG.IMP’ /ˈfarr/ - [ˈfarː] ‘flew 3M.SG.PFV’
Ultimate heavy closed	CCVVC	/bkʾaːl/ - [pkˤaːl] ‘eggs F.PL’

Table 2. 41: Harsusi syllable structures

STRESS PATTERN

The stress pattern in Harsusi is not very straightforward. There are certain general rules; however, exceptions to these rules are also found in the data. The following general rules can be stated for the stress pattern in Harsusi:

a. Word-final CVVC, CVCC and CCVVC syllables.

   /ˈhiːt/ - [ˈhiːt̪ʰ] ‘you 2M.SG’, /ʔeˈtoːm/ - [ʔəˈt̪oːm] ‘you 2M.PL’, /ˈðˤarb/ - [ˈðˤa̤rb̰] ‘twig/firewood M.SG’, /łaˈfajt/ - [łaˈfajtʰ] ‘three F.PL’, /ˈħseːb/ - [ˈħ.seːp] ‘count 2M.SG.IMP’ and /ʔenˈtsoːm/ - [ʔənˈt̪soːm] ‘breathed 3M.SG.PFV’

b. The rightmost heavy syllable in multi-syllable words unless there is long vowel in an earlier syllable.

   /ħaˈloːkmeh/ - [ħaˈloːk.məh] ‘there LOC’, /ˈħaːmuːten/ - [ˈħaː.muː.t̪ən] ‘mothers F.PL’ and [ħəm.bə.rəˈt̪en] ‘children-boys F.PL’, but /ðenˈbuːten/ - [ðəmˈbuː.t̪ən] ‘tails F.PL’

c. First syllable in di-syllabic words unless there is a long vowel in the final syllable.

   /ˈhałen/ - [ˈha.łən] ‘what’, /ˈmaken/ - [ˈma.kən] ‘a lot’, /ˈkʾaten/ - [ˈkʾa̤.tən] ‘slim M.SG’, /ˈðamneh/ - [ˈðam.nəh] ‘this M.SG’, /ˈxajmeh/ - [ˈxaj.məh] ‘five F.PL’, but /łˤeˈgaː/ - [łˤəˈgaː] ‘houses F.PL’ and /heˈmaː/ - [həˈmaː] ‘listen 2M.SG.IMP’.

CONCLUSION

This paper has tried to explore the basic phonology of Harsusi. It tried to investigate the various phonemes of Harsusi and their allophones in different environments. It has paid special attention to the group of phonemes labeled as 'Emphatics' which are the most interesting in Harsusi since they include both pharyngealized and glottalized emphatics. It has been found that the phonetic realization of 'Emphatics' is not the same in all environments.

The consonantal inventory of Harsusi includes 30 distinct phonemes with a three-way distinction. The vowel system includes 7 vowels in total which are 2 short and 5 long vowels. Tables 2. 42 and 2. 43 below show the different consonantal and vowel phonemes and their allophones, respectively.

Manner	**Phonemes**	**Allophones**	**Manner**	**Phonemes**	**Allophones**
Plosives	/b/	[b, p]	**Fricatives**	/f/	[f]
	/t/	[t, t^h]		/θ/	[θ]
	/$t^ˤ$/	[$t^ˤ$, t']		/ð/	[ð]
	/d/	[d, t]		/$ð^ˤ$/	[$ð^ˤ$, $θ^ˤ$]
	/k/	[k, k^h]		/s/	[s]
	/k'/	[k', $k^ˤ$]		/$s^ˤ$/	[$s^ˤ$]
	/g/	[g, k]		/z/	[z, s]
	/ʔ/	[ʔ]		/ʃ/	[ʃ]
				/$ʃ^ˤ$/	[$ʃ^ˤ$]
Laterals	/l/	[l]		/χ/	[χ]
	/ɬ/	[ɬ]		/ʁ/	[ʁ]
	/$ɬ^ˤ$/	[$ɬ^ˤ$, $ɮ^ˤ$]		/ħ/	[ħ]
				/ʕ/	[ʕ]
Nasals	/m/	[m]		/h/	[h]
	/n/	[n, m]			
Trills	/r/	[r]	**Glides**	/w/	[w, o]
				/j/	[j, i]

Table 2. 42: Consonant phonemes and allophones

Phonemes	Allophones
/a/	[a]
/e/	[e, ə, ʌ]
/a:/	[a:, ą:]
/e:/	[e:, a:]
/i:/	[i:, į, aj]
/o:/	[o:, ǫ]
/u:/	[u:, ų, aw]

Table 2. 43: Vowel phonemes and allophones

The syllable structure in Harsusi is rich with various types. They range between light open V and CV, heavy open or closed CVV and CVC, super heavy closed CVVC and CVCC and ultimate heavy closed CCVVC syllables. The consonant clusters and especially at word initial positions in ultimate heavy closed syllables of CCVVC need further investigation as some speakers tend to insert a vowel sound to break the cluster. However, this phenomenon has not been noticed as a regular pattern.

The stress pattern in Harsusi can be predicted based on certain general rules, but exceptions can still be found to these rules. The super heavy closed, CVVC and CVCC, and ultimate heavy closed, CCVVC, get stressed in word final. In multisyllabic words, the rightmost heavy syllable gets stressed provided that there is no long vowel before it. In di-syllabic words, the first syllable gets stressed unless there is a long vowel in the final syllable.

All in all, this study has probably tried biting more than it can chew by providing a thorough description of the phonological system of Harsusi. No major studies have been done until now on Harsusi; therefore, there is more to investigate and explore in Harsusi language in general and in its phonology in specific.

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